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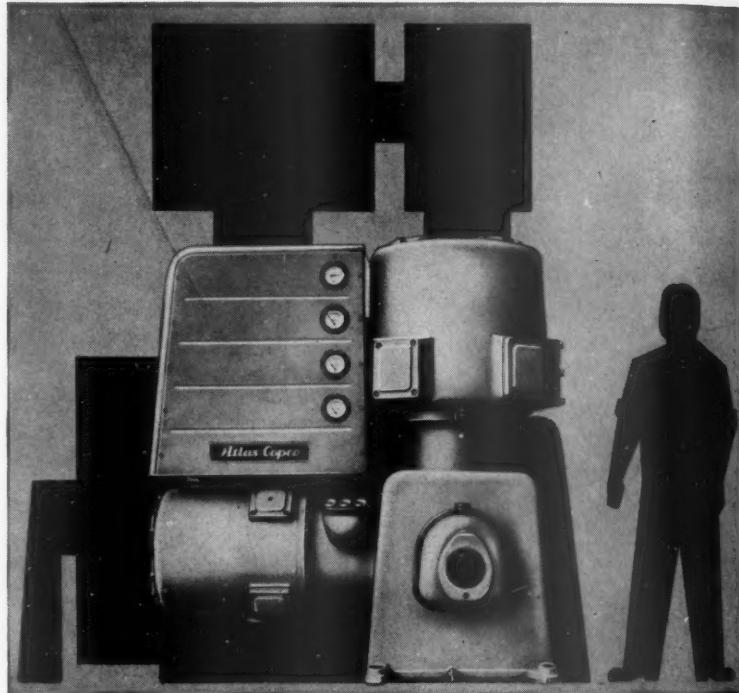
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Fair Prospect for Passenger Traffic

ALTHOUGH passenger receipts have been disappointingly low in recent weeks, the passenger business of British Railways can be said on the whole to be in a healthy state. On the debit side, first class travel continues to decline, except apparently in some long-distance expresses frequented by travellers on business; and receipts from a good many diesel railcars in rural areas, although they exceed those of the former steam trains on the same sections, still do not cover operating costs. On the other hand, where the railway service offered is attractive, and the traffic potential is reasonable, British Railways are holding their own, notably in express passenger traffic—where there are good payloads. Vigorous efforts are being made to capture traffic by means of cheap fares and imaginative publicity. There is, however, no reason for complacency. Punctuality on a good many main lines is bad. It is in matters such as these that the new traffic organisations already set up or taking shape in five Regions can effect improvements. There is always a tendency for commercial officers, having demanded a passenger train and arranged for advertising it, not to interest themselves in its per-

formance. Operating staff, and more particularly timetable and control staffs, who tend to live in ivory towers, are inclined to forget that passenger trains convey sentient, and articulate, human beings. This no doubt is because they have one eye on goods traffic and often are anxious to arrange as many paths and to put through as many trains as possible—perhaps with dire effects on important express passenger traffic. Under the new traffic organisation in at least one Region such departmentalism is no longer possible. The substance of public complaints—and suggestions—is made known to all concerned. The problem of punctuality is being tackled vigorously in some Regions, though we doubt whether the ill effects of over-ambitious timings are always realised. By and large, passenger traffic plans for the future—whether they involve diesel haulage by locomotives, or electrification, high-speed multiple-unit diesel trains, or intensive diesel local services, are sound enough—though one can always think of improvements. Their implementation is largely a question of awaiting delivery of motive power and rolling stock, or completion of modernisation works by the civil, electrical or signal engineers. The purely commercial side is well looked after. Unless there is a cataclysmal drop in public spending power, the future for passenger traffic is reasonably bright. General and traffic managers have the more time to devote themselves to the much more serious matter of freight traffic.

Sir Ralf Emerson

SIR RALF EMERSON, who has relinquished his appointment as General Manager of the Nigerian Railway Corporation, has held that office since the railway became a statutory corporation in October 1955. The Nigerian Railway System is the second largest in any British Colonial territory. Although Sir Ralf Emerson was appointed the first Chairman & General Manager of the Corporation, he had been serving in that capacity since 1953, when the project was first formulated. During the succeeding period the achievements of the railway have been considerable. Passenger and freight traffic have increased and there has been a corresponding rise in revenue. Much progress has been made in track rehabilitation and many major works have been completed. Diesel electric traction has been introduced, and a carrier telephone system installed. A great deal of passenger and freight rolling stock has been replaced and re-equipped in the Corporation's workshops. The satisfactory changeover in administrative organisation owes much to Sir Ralf Emerson's personality and ability. It is gratifying that, by retaining his appointment as Chairman of the Corporation, his services will not be lost to Nigeria.

Expansion and Improvement in South Africa

EVERY effort is being made by South Africa to ensure that the railway system is adequate for the expanding economy of the country. Nearly £100 million is to be spent on developing the railways and harbours during the coming year, according to estimates of expenditure tabled in Parliament last week. The amount is unequalled in the history of South African Railways and is £14 million more than was set aside for capital works last year. Among the projects to be undertaken or continued are: doubling of the Natal line; improved electrification of the Witwatersrand and other systems; railways to serve non-white communities in the neighbourhood of Capetown, Durban, and Johannesburg, and the purchase of diesel locomotives and rolling stock. The amount available from loan funds for rolling stock is nearly £28 million—almost double last year's allocation. It will be interesting to see how far diesel traction is to be extended.

Diesel Training for Canadian National Staff

THE rapid turning over to diesel traction of the Canadian National Railways has necessitated timely instruction of the staff concerned in diesel driving and maintenance. The problem has been tackled promptly;

last year the management increased the pace of the diesel educational programme. The number of staff who received training totalled 3,085 by the end of October. Some 2,800 have completed the basic course in engine maintenance and now are taking further courses to familiarise themselves with details of motive power supplied by the various private builders. The training, though on a large scale, is reported to be thorough, whilst the manufacturers have given much help. The magnitude of the problem is shown by the numbers respectively of C.N.R. steam and diesel locomotives: 2,133 and 615 in 1955; 1,895 and 783 in 1956; 1,705 and 1,105 in the summer of 1957; and 1,440 and 1,430 earlier this year; and replacement of steam is likely to take place with increasing speed.

Repeal of U.S.A. Freight Transport Tax

THE end of June brought some relief to the hard-pressed railways of the U.S.A. when the Senate, on June 19, voted to repeal the so-called "excise taxes on transportation" and less than a week later further progress was made in a Conference Committee of Congress. This means that the long-standing 3 per cent tax on freight traffic, the 4½ per cent tax on the movement of petroleum by pipeline and the 4 cents a ton tax on coal will disappear. It is disappointing that the 10 per cent tax on passenger travel could not have been abolished at the same time. All these taxes on the movement of passengers and freight originated in the war years. With passenger traffic the tax was designed to discourage unnecessary travel. In each case they have assisted in the diversion of passenger and freight traffic to the private car and the private carrier respectively, with consequent loss to the common carrier. Taxes on transport are inherently undesirable as they interfere with the logical development of markets, and industrialised countries cannot afford to discourage the freest possible movement of passengers and freight.

Increasing Proficiency in the Travel Industry

EFFICIENT travel agencies, where the staff has a good general knowledge of *inter alia* railway passenger timetables, routes, tickets, accommodation in trains, and catering arrangements, are some of the railways' best friends. In addition they contribute much to the national prosperity, which in Britain, as elsewhere, depends on a flourishing tourist industry. It is encouraging, therefore, to note the growth of the Institute of Travel Agents, which by systematic instruction in travel subjects and by examinations ensures amongst those in British travel agencies keen enough to study and undergo the tests, a high standard of professional knowledge. At the presentation at the Transportation Club, S.W.1, last week, of awards and diplomas to students successful in the examinations, the Chairman, Mr. H. H. Robinson, Assistant General Manager (Negotiations), Thos. Cook & Son Ltd., could report a rise in the number of registered students to nearly 200—almost three times last year's figure. Lord Colyton, President of the Institute, spoke with authority, as a former diplomatist, of the importance of international travel in the cause of world peace. All railway managements concerned with travel in Britain and between this country and abroad, especially the Continent of Europe, will follow the activities of the Institute with sympathetic interest.

Wagon Lubrication in the U.S.A.

THE results of pad-lubrication of wagons of the Norfolk & Western Railway of U.S.A. are worth noting. Over 81 per cent of that system's fleet, 50,631 bogie wagons to date, is fitted with lubricators, and it is hoped to complete equipment by the end of this year. During the past two-and-a-half years, wagons thus pad-lubricated have averaged 3,186,494 miles of running to every hot box requiring a wagon to be taken out of a train, compared with 1,072,006 miles for wagons fitted with axleboxes packed with oily waste. Wagons with lubricators run the 825 miles from Bluefield, West Virginia, to Atlantic ports with coal and return empty without any attention to

lubrication, whereas those with waste-packed boxes formerly were serviced every 100 miles. On the other hand, with lubricators the consumption of oil has much increased. Between 1932 and 1954 it averaged 1,620 wagon-miles a gal. of lubricant, whereas the figure has now dropped 55 per cent to 720. This is partly because the design of the pad-lubricated axleboxes makes complete oil sealing difficult. Another difficulty is that in cold weather the efficiency of lubricators drops considerably. It is hoped to find cures for both these troubles. Meanwhile it is felt that the lubricators have fully justified themselves by the reduction in servicing.

Modernisation in Poland

ACCORDING to a recent statement by the Polish Ministry of Communications, the total mileage of electrified lines in Poland is to be increased about ten-fold, to over 3,000, by 1975. By then, about 70 per cent of all traffic will be electrically hauled. Within the next two years, electrification work is to start in the Cracow district; in 1960-65, lines around Lódz will be converted, and further electrification work will be carried out in the Katowice, Wroclaw (Breslau) and Warsaw areas. During the five years 1965-70 conversions will include the Warsaw-Wroclaw lines. The official view is that the Pafawag works in Wroclaw will be able to provide the 40 electric locomotives and 30 three-car multiple-unit trains a year required by these ambitious plans. It is hoped that Pafawag will be turning out 46 locomotives a year by 1960. If it is necessary to obtain electric rolling stock from abroad, British manufacturers have ample experience of Polish requirements and conditions. The 15-year period beginning in 1960 is also to see introduction of diesel traction on a wide scale; by 1975 it is intended that 25 per cent of all traffic shall be diesel-hauled, consuming up to 2 per cent of oil fuel used in Poland.

Fewer Types of Swiss Electric Unit

REDUCTION of the number of types of electric locomotive, multiple-unit train, and railcar is an aim of the Swiss Federal Railways in formulating its motive power plans. The complete elimination of steam, for which these provide, is not yet complete; the number of steam locomotives on the 1,800 route-miles of broad-gauge system was returned recently as 187, compared with 205 a year previously, and with 643 electric locomotives at present, in addition to multiple-unit electric sets and electric railcars. The ultimate aim is one type of 6,000-h.p. locomotive for heavy express passenger and goods trains on the Gotthard and Simplon lines; a 4,000-h.p. locomotive for heavy trains on less heavily graded sections; a power car equal in power to the existing locomotive of the "Re 4/4" Bo-Bo type, mainly intended for hauling fast inter-city trains; a light multiple-unit set for lighter traffic; and, for suburban traffic, a multiple-unit design capable of rapid acceleration. In view of the variations in operating conditions in Switzerland, this represents a remarkable degree of simplification.

New Motive Power Depot in N.E. Region

THE largest single project to be completed, to date, in the North Eastern Region under the British Railways modernisation plan is the motive power depot at Thornaby-on-Tees. Covering an area of some 70 acres, the depot, which can deal with up to 220 large locomotives, replaces the two obsolete depots at Newport and Middlesbrough. A description is given elsewhere in this issue. An important feature is the provision for ease of conversion to deal with diesel and electric locomotives which it is envisaged will be introduced at a later date in this part of the Region. The fact that much of the £1,250,000 spent on the depot is in respect of equipment suitable for steam locomotives only, such as the mechanical coaling plant and boiler washing facilities, emphasises the continuing and long-term reliance which will be made on steam for motive power. Of the three sheds provided, one is octagonal, nearly 300 ft. in dia., with a turntable giving access to 22

stalls; this seems unusual, for judging by recent practice, the roundhouse layout seems to have been discarded by many railway managements.

Roundhouse versus Straight Shed

THE roundhouse at Thornaby shows that the belief in this layout is still held firmly by some railway officers. It is argued that provided nothing goes wrong with the turntable, which would isolate some locomotives, the evidence is that a round is cheaper to work than a straight shed, as a great deal of daily shunting is avoided and better facilities for maintenance and repair are provided. The North Eastern Region is traditionally a roundhouse Region, and when Thornaby was originally planned for steam locomotives before the modernisation plan was announced, it provided for two roundhouses and no straight shed. With the modernisation plan, however, it was considered that while the roundhouse design was ideal for steam locomotives and would be very suitable for diesel locomotives, and possibly even electric locomotives, the need for selection would not be so great with the two latter types of traction as fewer classes are needed; also, as fewer servicing operations would be necessary for diesel and electric locomotives, which would be less likely to be so immobile when under repair, the cost of providing two roundhouses could not be justified. The straight shed has been provided, therefore, instead of one of the roundhouses, to cater for electric locomotives at a later stage.

Mechanical Stokers on British Railways

WHEN a locomotive is too large to be fired at maximum capacity by hand, mechanical firing becomes necessary. The size at which this is reached depends on several factors; a generally accepted, but quite arbitrary, figure has been 50 sq. ft. grate area. On British Railways, with changing operating factors, such as poorer qualities of fuel and the need for fast freight services, necessitating longer, heavier trains, the point is being reached when the maximum potential output of the locomotives, particularly of the standard Class "9" 2-10-0 freight design, is being prevented by the physical difficulty of firing a heavy locomotive over an extended period on fast and heavy long-distance runs. As reported elsewhere in this issue, three Class "9" locomotives have been fitted with the Berkley stoker; although they have a grate area of under the optimum 50 sq. ft.—it is in fact 40·2—it has been felt worth while to make trial once more of mechanical stokers in this country. In view of the changed and changing conditions, and of the proved reliability of this make of stoker elsewhere, particularly in South Africa, it may well be extended to other locomotives of this and other British Railways classes.

"WL" Locomotive Performance

THE well-known Indian State Railways' "WL"-class 4-6-2 broad-gauge steam locomotives may be taken in a wide sense as representative of broad-gauge and standard-gauge Pacifics in extra-European countries, and therefore some of their measured performances are of interest as providing a comparative basis. Tests made when burning Argada (Bengal) coal, of 11,150 B.Th.U. per lb., showed a maximum i.h.p. of 1,540 at 45 to 60 m.p.h., and a non-corresponding maximum d.b.h.p. of 1,180 at 31 to 36 m.p.h. Lowest steam consumption was over the speed range 35 to 45 m.p.h. and the i.h.p. range 850 to 1,050, and under those conditions averaged 16·3 lb. per i.h.p. hr., inclusive of auxiliary consumptions. Lowest coal consumption was over the same track speed range, and averaged 3 lb. per i.h.p. hr. and 4 lb. per d.b.h.p. hr. Boiler efficiency varied from 69/70 per cent at a firing rate of 50 lb. per s.f.g. hr. to 59 per cent at 105 lb. per s.f.g. hr., and smokebox vacua corresponding to those two firing rates averaged 1·2 in. and 4·3 in. of water respectively. An appreciably sharper drop in boiler efficiency, with increase in firing rates, occurs when Central Sauda coal of 10,800 B.Th.U. is being fired.

A Welcome Break

WITH Parliament in recess until the end of October, the transport industry should be free from overzealous political attention and able to enjoy a well-needed period of calm. The session, which is now virtually ended, as Parliament is to reassemble only for its prorogation, unless unforeseen international developments lead the Opposition to demand an earlier recall, has seen no major legislation on transport matters. That does not mean that the industry has escaped Ministerial or Parliamentary attention; but neither has been such as to affect seriously its finances or its future, as did such previous Ministerial interference over charges during the previous session. It is true the Government cut back the British Transport Commission capital investment programme by imposing a ceiling of £145 million for two years. Fortunately this proved to be only temporary; the cut now has been restored, and the Commission is satisfied that its current programme is as large as is practicable in the light of availabilities of materials and manpower. The retardation did not last long enough to have any lasting effect on the modernisation programme, which is now going full steam ahead.

Wage claims from the railwaymen and other sections of transport workers caused transport to command much Parliamentary debate and questioning. Although the railway strike was averted, the rather unnecessary bus strike was not, which has had a depressing effect not only upon London Transport receipts but upon the relations between management and men in that section of the Commission undertakings, which so far fortunately has not spread to the railways. The increased costs arising from the grant of increased wages which run into many millions have stressed the serious state of the Commission finances, and although the Government has preferred to let things ride for the present, the Opposition dispersed from Westminster much concerned at them; fearful, probably, that it will be left to deal with a nationalised industry accumulating deficits and carrying forward a deferred liability running into hundreds of millions, it would prefer the Government to shoulder the responsibility for action now. In the event, the Government is probably following the wiser course, because the modernisation plan is beginning to bear fruit. The current recession probably is the main cause of the fall in freight traffics. In any case, the Commission, having launched out with vigour on conversion to electric and diesel traction and accelerated the elimination of unremunerative services, might now be wise to concentrate on improving the quality and reputation of British Railways goods services.

However, with probable freedom from interference for the next few months the Commission should be able to devote its attention to these matters and consolidate its position. Fortunately at present it appears that the coming Parliamentary session will also be free from major transport legislation. The Queen's Speech is not likely to include any reference to such measures, unless at last the promise to implement those sections of the Gowers Report relating to working conditions on the railways is fulfilled. If it is not, the Opposition Members associated with the railway unions will want to know the reason for the omission. Otherwise Parliament should be comparatively free from transport affairs. The scheme will first shift to the annual conferences of the Trades Union Congress and the Labour Party; to judge by the resolutions on the agenda, demanding a revision to comprehensive nationalisation of the transport industry, an indication of future policy will be sought. From the tone of these resolutions, and the speeches of Opposition spokesmen on transport matters in the House of Commons, the policy of re-nationalisation stands, and the concept of restoration of a transport monopoly remains. While, therefore, the transport industry may look forward to another year free from political interference, there is the shadow of future disturbance, should the general election now generally expected for next year result in a change of Government. It is best for the Commission to ignore this sword of Damocles, because the more it consolidates its position, and succeeds in co-operating with

the rest of the industry, the less severe may be any reconstruction should Labour return to power.

While therefore on the floor of Parliament the Commission's affairs, assuming always there is no labour dispute nor a general rise in charges, may attract less attention, there remains the possibility of the Select Committee on Nationalised Industries turning its attention to its affairs. That Committee, however, has reported that it is engaged on an investigation into the civil aviation corporations, and when it is reappointed early in November it will continue with that. This may well occupy it well into the Spring of 1959. Should an inquiry into nationalised transport be next decided upon, it could not begin till then, and possibly the Committee would be unable to complete it and publish a final report before an election takes place.

The Only Ones in Step

THE present attitude of surly belligerence assumed by London and municipal bus workers finds no sympathy with the unbiased onlooker. One of the most valuable lessons to be learnt in any negotiation is that the exercise of diplomacy gives a surer guarantee in the achievement of an aim than the use of force. Another factor which goes far to smooth the path of victory is the maintenance of public favour. Neither of these talents has been practised recently to a noticeable degree by the busmen. On the contrary, their apparent determination to ignore all but their own supposed interests has resulted in a marked souring toward their cause of public opinion.

London Transport's recent offer of 5s. a week to country drivers and 7s. 6d. to Green Line coach drivers was made notwithstanding an exclusive award by the Industrial Court. By their continued insistence on strike action the busmen forced this increase against the better judgment of both Executive and Government, each of which knew that L.T.E. finances could not support such an award unless stringent economies were made. The position was made as clear to the Transport & General Workers' Union as were the similar difficulties of the British Transport Commission to the railway unions during the recent pay negotiations for British Railways' personnel. Despite this clarification, the T. & G.W.U. insists on simultaneously having and eating its cake. Last Friday, at a delegate conference in London, Mr. Arthur Townsend, National Bus Group Secretary of the T. & G.W.U., reported on the economies proposed by London Transport to pay for the wage increases. Dissatisfaction was strong and vocal, and it was decided to withhold co-operation in carrying out the economies. Although a resolution was lost calling for refusals to work private hire, accept standing passengers, return early from terminals, or turn buses, the decision against co-operation, if carried out to the extent of "working to rule," could cause some disorganisation of services.

This reaction to a situation not capable of solution except by the measures proposed by the Executive is immature and unwise. Although a certain amount of traffic might be lost if the busmen put their proposals into practice, the loss is likely to be relatively slight. The Executive would suffer far less than the public which, as is usual in these matters, would have to bear practically all the brunt of any inconvenience caused. There are signs that the busmen may not continue to treat the public with impunity. During the strike, national opinion was almost unanimous in its condemnation. It is probable that further obstructive behaviour would have an extremely poor reception and that little attempt would be made to accept or sympathise with the rank-and-file's point of view.

Although an application of "working to rule" might lose only a small number of passengers, the busmen would be ill-advised to cause even so slight a reduction in the bus-travelling public. Last week we published a summary of the speech made by Mr. H. G. Drayton, Chairman of the British Electric Traction Co. Ltd., at the company's sixty-second annual general meeting. Mr. Drayton referred to last year's strike of provincial busmen and described the harm it caused to the industry. Its timing to coincide with the height of the holiday season forced many of the travel-

ling public to cancel and forgo their holidays. Mr. Drayton believes that many regular users have adopted other means of transport as a permanent result of the strike. We add our opinion that a large percentage of these lost customers is likely to feel strong and lasting antipathy toward those who, in acting for themselves, ignored the interests of others. This resentment is probably extendible to the affairs of busmen throughout the country. Mr. Drayton stated that fares had to be increased to cover the wage award, the ungracious acceptance of which terminated the strike, and pointed out that these higher fares had resulted in the further loss of business. They also may well have resulted in a further hardening of public opinion. The increase in fares proved insufficient to meet the costs involved under the new wage structure in the operation of unremunerative service: the cancellation or cutting of these will affect both public and busmen alike. Mr. Drayton regretted that the unions had refused to co-operate when the case was presented for arbitration to the Industrial Disputes Tribunal. "Such an attitude," he said, "is not encouraging in trying to arrive in a civilised way at a solution of a difference." The definitions of civilisation are many: perhaps the simplest is that it is the state of human co-existence within an ordered economic frame: work. Whether or not this definition is generally acceptable, one thing at least is certain. That is that a stable economy is the basic requirement in a community of any size or kind. A selfish refusal to consider the interests of the populace as a whole hardly can be considered as co-operative and certainly may not be expected to produce results beneficial to the nation as a whole.

International Co-operation in Railway Research

THE increasing importance, to railways in Asia and Africa, of knowledge of the results of research into the many technical questions which must be answered by railway managements and technical staff is shown by the admission in 1957 of the Indian Railways to membership of the Office for Research & Experiments (O.R.E.), at Utrecht of the International Union of Railways (U.I.C.). Whilst there are railway research facilities in Asia, such as the Indian Railway Board Research, Design & Standardisation, and Organisation section, with its experimental station at Lucknow, the establishment at Utrecht benefits from the great variety of talent and experience afforded by the railways of Europe, including British Railways, and some neighbouring countries. The Indian membership has increased the number of member-administrations to 27, of which 18 are in Europe, three in Asia, and three in Africa (Belgian Congo), whilst the remainder are bodies such as the Wagons-Lits Company concerned in the operation of international traffic. Since April 1, 1957, several new questions have been added to the O.R.E. programme of work; the increase is partially compensated by the termination of other questions. They cover a diversity of subjects relating to permanent way, rolling stock, locomotives, and electronic apparatus.

One of the most important of the 16 questions on the programme, in view of the large amount of a.c. electrification work at present in progress, is the behaviour of pantographs and catenary at high speeds. The first report on the tests carried out with pantographs for alternating current has now been published. The French National Railways in its special test runs at speeds in excess of 200 m.p.h. on 25-kV. 50-cycle electrified lines found that the effect on pantograph and catenary was highly detrimental, and this report will no doubt go a long way towards solving these problems for high-speed operation.

In its *Bulletin* dated July, 1958, the O.R.E. states that the occurrences which take place during the collection of current by the locomotive from the contact wire are of a dynamic and electric nature on the one hand, and of a mechanical and electric one on the other hand. The dynamic and electric occurrences are covered by the report referred to above, but a separate question has been introduced to elucidate the mechanical and electric occurrences which, above all, make themselves felt by the wear of the

pantograph contact strips and contact wires. With the increased application of electric traction remarkable savings in maintenance, expenditure on pantographs, and overhead equipment can be achieved by the judicious selection of materials, particularly of contact strip materials, where high speeds are to be adopted. In assessing the cost of renewal of a contact strip, not only the cost of material has to be considered, but also the amount of operation required from the workshops as well as the time the motive power unit remains immobilised. Similar considerations apply to the renewal of the contact wire.

Considerable progress has been made with several questions relating to passenger and freight rolling stock. One of the main tasks of the specialists committee entrusted with the study of the strength of passenger coach bodies is to draw up a standard specification for the strength of coach frames used in international traffic and to seek a method of calculation. Tests were carried out in 1957 on several coaches of modern construction, and a report summarising the results of static and dynamic load tests carried out on 12 international and main-line coaches was submitted to the control committee in March, 1958.

As a result of tests in carriage and railcar heating carried out during the winter of 1955-56 certain improvements were made to heating systems. To verify the results of these improvements new tests were undertaken in February, 1957. These tests also compared a modulated air system with a convection heating system; both being installed in coaches of identical construction. The report of these tests submitted to the O.R.E. control committee last March contains recommendations for the construction of heating and air-conditioning systems of coaches. In conjunction with the tests, studies have been carried out into the conditions which the heating and ventilation installations must fulfil in relation to various comfort factors. The construction of a climatisation chamber to form part of an existing research centre in Vienna built by the Austrian Government in conjunction with O.R.E. is envisaged. This installation would be of the greatest importance to the administration both from the technical and economic point of view.

Worsening of the Railway Position

(By a correspondent)

WITH the efflux of time the freight traffic position on British Railways is becoming critical. In its 1957 report the British Transport Commission stated that the Area Boards were devising new traffic organisations which would assist the railways to mould their marketing and operating methods on modern lines and recover traffic. The report also claimed that "the freight services which all Regions were offering to traders at the end of 1957 had greatly improved both in scope and in quality over those available a year earlier." With the help of these new facilities and greater freedom in charging, the Regions were said to be waging "campaigns aimed at maintaining and increasing the traffic in goods for which rail transport is particularly suitable." So far from these measures bearing fruit in 1958, the decline in freight traffic, which began in January and was partially checked by the middle of May, now threatens to become a *débâcle*.

No. 6 of *Transport Statistics* shows that, in the four-week period to June 15, the railways originated 18,189,000 tons of traffic, 2,484,000 tons, or 12 per cent, less than in 1957. Compared with the same period of 1951, the railways lost over 4 million tons, or nearly a fifth of their carryings. There was a drop in merchandise of 35 per cent from 4,266,000 tons in 1951 to 2,745,000. Minerals were down 791,000 tons, or 16 per cent, while 2,050,000 fewer tons of coal and coke were declared—a fall of 15 per cent. Traffic receipts for four weeks to July 13 indicate that the attrition of freight traffic persisted into the second half of the year, making the future outlook almost as disheartening for railwaymen as the 1933 slump. The railways can no longer profit from record outputs of iron and steel. There is

some slackening of activity in the textile and other industries; perhaps more serious for the railways was the setback to the National Coal Board production of coal by 1,261,400 tons during six weeks to July 26.

OPERATING STATISTICS

In four weeks to June 15 the railways worked 1,364 million ton miles, 209 million fewer than in 1957. The decrease of 13 per cent was spread over all Regions in proportions varying from 11 per cent in the Scottish to nearly 15 per cent in the Eastern. The shrinking traffic volume affected many statistics for 12 weeks to June 15 which are reviewed below.

Freight train-miles were reduced by 1,540,000 (5 per cent) to 29,498,000. Electric train-miles were cut by 17 per cent to 378,000, while 145,000 diesel-train miles represented a new feature, which will become more important as time passes. Freight train-hr. were shortened by 187,000 (5·8 per cent) to 3,060,000. Shunting engine-hr. decreased at nearly the same rate by 189,000 to 3,257,000; the Eastern, North Eastern, and Scottish Regions cut their shunting-hr. at a higher rate than train-miles, though they had no exceptionally large decreases in loaded wagons forwarded.

The freight train load of 149 tons was nearly six tons less than a year ago. The Scottish Region almost succeeded in keeping its load up to last year's figure of 107·35 tons; the Eastern load dropped from 181 tons to 169, still the best Regional result. An improvement in steam train speed was to be expected, but it was merely a trifle faster at 9·66 m.p.h. It is too early to criticise the slow diesel movement, but the division of responsibility for the working of the Manchester-Sheffield electrified lines between the Eastern and London Midland Regions has slowed down train speed on both sides of Woodhead. For the whole of the lines the Eastern recorded a speed of 9·79 m.p.h. in 1956 and 9·66 in 1957; in 12 weeks to June 15 speed on the east section was 9·04 m.p.h., against 9·33 in the same period of 1957. On the west section the London Midland brought the rate of progress down from 10·37 m.p.h. in the 12 weeks of 1957 to 9·77.

The output of freight train operating, measured by net ton-miles per train-hr., was lower by 38 points, or 3 per cent, at 1,173. The number of wagon-miles worked in a train-hr. also dropped by 3 per cent. to 220. The Eastern, North Eastern, and London Midland statistics were well above both of these all-line averages; the Western figures were 1,076 ton-miles and 199 wagon-miles.

FREIGHT ROLLING STOCK

In 12 weeks to June 15 British Railways withdrew 41,250 obsolete wagons from traffic, while building 2,921 new wagons in their workshops and purchasing 6,497 from contractors. The wagon stock was thus reduced to 1,071,240, a decrease of 31,812 since March 24. Wagons under repair at June 15 numbered 62,748, or 5·8 per cent of total stock, leaving 1,008,692 available for traffic—16,939 fewer than at a comparable date last year. As wagon loadings during 12 weeks were down 10 per cent, there could be little risk of a wagon shortage.

At June 15 the locomotive repair position was little better than in March. The number of steam engines out of action was 2,762, or 16·6 per cent of stock. Of 180 diesels (mechanical and hydraulic) 17 were unserviceable. Though 66 new diesel-electric locomotives were installed in 12 weeks to June 15, raising the stock to 773, no less than 86, or 11·1 per cent of stock, were under repair. In the same period 253 new diesel multiple-unit passenger carriages went into traffic, bringing the stock of these modern vehicles up to 1,903; to have 167, or over 8 per cent, of that expensive stock under repair on June 15, is serious.

CONCLUSION

This review of the published statistics proves that railway goods and mineral business is retrograding at an alarming rate. If particulars of current expenditure were known, as they are in the U.S.A., the railway position would probably be revealed as precarious in the extreme.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

Smoking in Trains

July 29

SIR.—Complaints of smoking in non-smoking compartments are once again receiving prominence. Surely, smokers only offend in crowded trains?

When non-smokers are prepared to stand in the corridors or non-smoking compartments, or travel by a later train, then shall I be prepared to believe they have a genuine complaint. No doubt these same people, on occasion, travel by motorcoach, and survive!

Yours faithfully,

S. L. ECCLES,
Station Master

Northampton (Castle), L.M. Region

Railway Workshops Policy

July 30

SIR.—In your issue of July 25, in the editorial article entitled "Justifiable Apprehension," you begin by saying: "This journal has repeatedly expressed the view that the primary functions of railway workshops are those of rolling-stock repair and maintenance." Later you state that "a strong case can be made for the near-exclusive allocation of railway repair and maintenance work to railway workshops."

On page 112 of the same issue you quote Mr. G. R. H. Nugent, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, as saying in the House of Commons that "the B.T.C. policy was that maintenance should continue to be carried out as far as possible in the railway workshops."

As Chairman of the Wagon Repairing Association I think I should make it clear what are the facts. Immediately on the outbreak of the war of 1939-45 the Government requisitioned all railway wagons and put them into a common pool. Until that time the repair of private owners' wagons, roughly half the total, had always been undertaken either by the owners (mainly colliery proprietors) or private repairers, and by arrangement with the Ministry of War Transport they continued with the work. Later they continued by arrangement with the British Transport Commission.

On January 1, 1948, of course, private owners' wagons were expropriated, and since then their numbers have become fewer and fewer. The Commission ordered thousands of steel wagons and as these were delivered the ex-private owners' wagons, which were mainly of wood, 13-tonners, were drastically reduced in numbers. More recently, owing to there being a glut of wagons and less traffic for them, there has been a wholesale scrapping policy, which I believe is going on at the rate of something like 3,000 wagons a week, including ex-railway-owned wagons. The wagons being scrapped are almost entirely wood, and these were the principal ones that needed repairing, whereas the new steel wagons will not need repairing for some years ahead.

There is, in consequence, a serious shortage of work, and my Committee is pressing that this should be shared fairly and equitably between the private and the railway shops. It makes this claim on many grounds: First, there are several private repair shops which have been in existence almost since railways began. Many of the companies are not only repairers but have large facilities for the manufacture of the components used, namely, axleboxes, brass bearings, springs, drawgear, and so on. Then again our works are strategically situated, by which I mean that a train load of wagons at my own company's head works at Springs Branch, Wigan, for instance, is taken from the shops and delivered to adjacent collieries within a few hours, which is exceptionally important in times of emergencies brought about by fog or sudden demands.

Again, the fact that the private repairers' works are spread throughout the country has been generally recognised as of importance in time of war, when otherwise the bombing of say one big railway shop like Derby might be fatal to the national transport system.

Finally, there are many thousands employed in the private wagon repairing industry, as well as many millions of pounds invested; and my Committee is strongly of opinion that British Railways should not contemplate building a single new works without previous consultation as to whether the existing facilities are not more than adequate. After all, they were adequate when the demand for repairs was far greater than it is today.

There is a lot more that could be said; but I hope the foregoing will be sufficient to show the importance of our industry to many who have not been aware of it till now.

Yours faithfully,

F. T. HANSON

C/o Central Wagon Co. Ltd., Wigan

Resilient Pads on Permanent Way

July 30

SIR.—I was interested to read your correspondent's views on resilient rail pads in your issue of July 18.

The main point to be assimilated is one which I have advocated strongly in the past: namely, that the elastic characteristics of pad and rail fastening cannot be divorced.

I would like, however, to take up your correspondent on one point, namely, on the "optimum curve" for a pad to match a given rail fastening. Agreed that the diagram presented and the arguments expounded are presumably theoretical, it is nevertheless a fact that of a very large number of load deflection curves for resilient pads which I have examined, the theoretically ideal shape of curve is in fact never attained neglecting for the moment its relationship to a given fastening curve.

This is not surprising when one considers the behaviour in compression of the medium with which we are principally concerned, i.e., rubber. When a flat sheet with configurations on its surface is subjected to compression to the order of deflection with which we are concerned, the load deflection curve, notwithstanding theoretical considerations, is, in the writer's experience, never linear but assumes a truly curved shape. Further, there is rarely a distinct discontinuity in this curve as might be imagined to occur when the configurations are eliminated by load. There is in fact a gradual increase in stiffness as the configurations are gradually eliminated.

The fact that in practice this double linearity effect is not achieved is not however of vital importance since it is possible to produce a curve which will approximate to a given pair of intersecting straight lines and will therefore, as a load deflection curve, have much the same properties. The absence of a distinct change of gradient in such a curve is again not critical provided that in general the approximation is reasonable.

Two other points are worthy of note in so far as optimum load deflection curves for resilient pads are concerned: While, using the diagrams and arguments put forth in your correspondent's article, a limiting curve for a pad to match a given rail fastening can be drawn, there are an infinite number of further curves which can be drawn which will satisfy the arguments put forth, yet in practice be generally too soft for use. The second point is that even were the fastening to be of the singly elastic type as opposed to the doubly elastic type shown, the matching pad curve would, as a theoretical ideal, still need to be doubly elastic.

Yours faithfully,

D. L. BARTLETT

93, Peplins Way, Brookmans Park, Herts.

THE SCRAP HEAP

Speeding Up—and Down

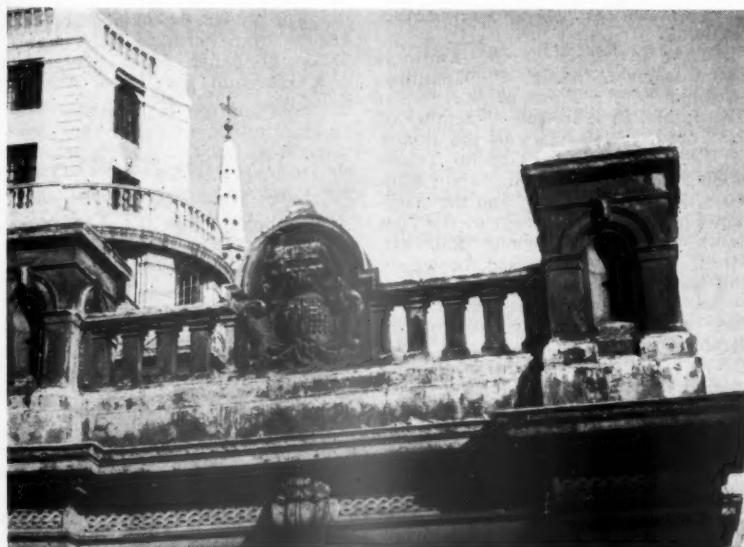
The escalators at Holborn station travel at a pace appreciably faster than those at other Underground stations. A general speeding-up of the escalators would make a significant contribution to the rapid movement of people at these stations, particularly during the "rush hours."—*Letter to the "Evening Standard."*

Delivery Dates in '98

The report that Japan will give out some heavy contracts in connection with the railroads during the present half-year has had a good effect, but British builders of locomotives will have to look to their laurels in the matter of expedition. It is by reason of the rapidity with which American houses turn out work that they have captured not a few good contracts of late in the East and Far East.—*From "The Financial Times" of July 11, 1898.*

Former Gateway to the Continent

Widening of the Strand has involved demolition of familiar features of Charing Cross Station, British Railways, Southern Region—terminus, before the war of 1914-18, of South Eastern and, from 1899, South Eastern & Chatham Railway Dover and Folkestone boat trains. A correspondent has sent us the photograph reproduced in the accompanying illustration. It depicts the coat-of-arms on the rear side tablet on the western kiosk flanking the entrance forecourt. This kiosk was a *bureau de change* for many years before the first world war; the eastern kiosk was occupied by a tobacconist.



Photo]

Arms of the Charing Cross Railway Company on kiosk, now being demolished, at forecourt gateway of Charing Cross Station, Southern Region; the spire in the background is that of St. Martin-in-the-Fields

Both kiosks were identical beneath the various trade signs they bore.

The front tablet bore the arms of the South Eastern Railway. The arms on the tablet in the illustration are those of the Charing Cross Railway Company, with the "Southwark Cross" on the left and the arms of the City of Westminster on the right. This company, formed in 1859, promoted the S.E.R. extension from London Bridge to Charing Cross and Cannon Street. It was amalgamated with the South Eastern in 1863. The extension into Charing Cross was opened in January, 1864, and that into Cannon Street in September, 1866.

"Golden Arrow?"

Since the U.S.A. built its gold depository at Fort Knox, in 1936, every ounce of gold transferred there has been carried by rail. During two periods, one in 1937 and one in 1940-41, five railroads carried 550 cars of gold bullion valued in the aggregate at 15·5 billion dollars. Before the movement of the first gold train, special steps were taken to develop equipment, schedules, and protective measures. An empty mail storage car was carried directly behind the locomotive as an emergency car. This was followed by a combined car for baggage behind which were six mail storage cars with gold bullion trailed by three sleepers and a dining car for the four post office inspectors, 12 railway post office clerks, two army officers and 32 soldiers carried on the train. The mail storage cars assigned to this service were specially fitted in a Pennsylvania Railroad shop. The gold bricks, slightly

smaller than ordinary bricks, were packed in iron reinforced oak boxes 8 in. deep, 20 in. long and 10 in. wide. Each box of gold bullion contained 500 lb. Four boxes were secured on each skid and 120 boxes were loaded into each car. Thus each car loaded with 60,000 lb. of gold had a value of more than £9,000,000.—*From the "Illinois Central Magazine."*

Trained Footballers

Last year, Carlton League team chartered a diesel rail-car to travel to Geelong for the match there. They were the first League team to do this. This season, Melbourne followed their example and chartered a railcar. They won the match by a big margin. Good news spreads; and South Melbourne chartered a rail-car for their match at Geelong. They won, too.

By way of contrast, Geelong still follows the old practice of hiring a bus. Recently, the bus didn't want to start for the return journey, and club players had to stand by for some time until the trouble was rectified.

Which all goes to show, as Tom Train would have said, that good training is the best form of travel.—*From the "Victorian Railways News Letter."*

Silent Service

(Mechanised booking offices: see our July 18 issue)

When one gets down to studying automation

Queries emerge which call for cogitation:

Is it the amber light for those who shirk
Or just the long-sought antidote for work?

Now it invades the booking-clerk's domain,
Where I first learned to know and love the train
And strove to match the ticket-issuing skill
And deft manipulation of the till
Displayed by those involved in my induction,
Who did their best to further my instruction.

Soon, it may be, machines will do it all
And man, escaping from the age-old thrall
Of the three Rs, may be in a position
To take the tedious "add" out of "addition."

When man's gregariousness forsakes the scene
Before the onward march of the machine,
We shall no longer find the local station
The old-time rendezvous for conversation
And all the booking-clerk will need to know
Is how to feed the brute and make it go.

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

RHODESIA

Seat Reservation

Rhodesia Railways recently re-examined the method of booking seats in trains and the issue of tickets, particularly with reference to passengers who reserve seats and then fail to take them up. It was decided to accept bookings for destinations within the Rhodesias for dates no more than 30 days ahead. This became effective on August 1; but all bookings made before that date on the 90 days' basis, stand. Reservations for dates up to 90 days ahead continue to be accepted in bookings to places south of Bulawayo and destinations outside the Rhodesias.

SOUTH AFRICA

Synthetic-Rubber Sleeper Pads

Sixty-one thousand neoprene synthetic rubber pads for pre-cast concrete sleepers are being supplied to the railways by Dunlop South Africa Limited. Because of the insulating properties of the rubber, steel rails can now be used as conductors for electric signalling; this, it is estimated, will save up to £1,000,000 on new signalling schemes at present under consideration. The pads are of the envelope type and fit between the rail and the clips fixing it to the sleeper.

INDIA

Efficiency Shields

The Railway Board is considering a proposal for periodical award of shields for the best performance by each railway in passenger and goods transport. Separate shields would be instituted on each railway on an inter-divisional or inter-district basis. Criteria would include items such as wagon and locomotive user, economy in coal and oil consumption, punctuality, and accident records.

Railway Co-operative Societies

Over 56,500 railwaymen are members of the railway consumer co-operative societies, according to a half-yearly report for the period to December 31, 1957. Membership during the second half of the year showed increase of 11.5 per cent as compared to the first half of that year. On the Southern Railway the number of members was over 10,000. The number of societies increased from 111 to 118, of which the Chittaranjan Locomotive Works and the Integral Coach Factory at Perambur had one each.

Waiting Rooms for Women Passengers

Women passengers travelling third class are to be allowed to use ladies' waiting rooms, at present reserved for first and second class passengers. At

stations with only one ladies' waiting room, third class female passengers will be allowed to share it with passengers travelling first and second; at stations with separate first and second class ladies' waiting rooms, the second class rooms will be available for third class passengers also. Where the former intermediate class ladies' rooms were converted for other use after the abolition of inter-class, these, wherever possible, will be re-opened for the use of third class female passengers.

VICTORIA

Road Competition

A suggestion by the Australian Railways Union that the Victorian Railways should install their own fleet of radio-controlled road vehicles has been described by State Minister for Transport, Sir Arthur Warner, as impracticable. He said that if the railways ran their own road transport, every carrier in the State would try to beat the railways, more particularly on interstate hauls. "To the extent that we fight them, they operate on the roads against the railways," he added; "but to the extent that we co-operate with them, they will pick up goods and send them via the railways interstate. Every large carrying company has its own clientele. The railways has no clientele for road deliveries. Our plan is to induce carrying companies to bring more business to the railways."

New Wagons

The first of 100 "BP" class covered wagons to be built in the Victoria Railways workshops went into service recently.

At the invitation of the Railways Commissioners, Mr. F. P. Mountjoy, chairman of the Transport Regulation Board; Mr. B. J. Binger, a member of the Board; the secretary of the Board, Mr. E. V. Field; the General Traffic Manager of the South Australian Railways, Mr. F. B. Harvey, and the Assistant Chief Traffic Manager of the New South Wales Government Railways, Mr. J. A. Russell, inspected the wagon and watched the loading operation.

Some of the contents, because of their nature, were protected with inflatable rubber dunnage, as used in the U.S.A. This consists of nylon or other rubberised bags, inflated to certain pressures to cushion the load against movement during transit. The wagons are being fitted with passenger type bogies enabling them to be attached to passenger trains running at up to 70 m.p.h.

A prototype of another box type wagon, the "B" class, has been in service for some time. The wooden floors of the "BP" and "B" class wagons are designed to support the weight of fork-lift trucks with an individual wheel load of up to a maximum of one ton.

Internal rings and wooden battens enable loading to be firmly lashed. The "B" wagons have a tare weight of 11 and a capacity load of 13 tons. Cubic capacity is 1,440 cu. ft. "BP" wagons have a tare weight of 22½ tons, a capacity load of 33 and a cubic capacity of 2,670 cu. ft.

Gippsland Line Duplication

A further stage of duplication of the Gippsland line was completed recently, when a section of track through Nar-Nar-Goon Station was brought into use, completing track duplication between Pakenham and Bunyip. This also brought into operation both sides of the island platform at Nar-Nar-Goon.

WESTERN AUSTRALIA

Motor-Car Bodies by Rail

Two motor-car bodies will now be carried in a single railway wagon as a result of experiments conducted over the past few months by the Government Railways.

The new method of loading the motor bodies, over 200 of which are transported from the Eastern States by rail each week, entails one body on the floor of the wagon whilst another is carried on a steel frame mounted above the wagon side. The design of the frame permits various type motor bodies to be transported under this system.

Large-scale adoption of double-decker loading method will follow the success of the experiments and this will provide for more economical transportation of motor body traffic and will reduce the haulage of empty wagons from Perth to Kalgoorlie, the break of gauge point between the W.A.G.R. and the Trans Australian Railway.

UNITED STATES

Large-Scale Railway Mergers

It is thought that the application to merge the Great Northern; Northern Pacific; Chicago, Burlington & Quincy; and Spokane, Portland & Seattle Railways into a single undertaking will be filed later this year. The C.B.Q., though operated as a separate concern, already is jointly owned by the G.N. and N.P., and provides the access for both companies from St. Paul and Minneapolis into Chicago; while the S.P.S., also under joint ownership, provides similar access for both from Spokane into Portland, Oregon.

At present the Chicago, Milwaukee, St. Paul & Pacific Railroad is the only line with its own tracks throughout from Chicago to Seattle-Tacoma; in conjunction with the Union Pacific and Milwaukee also operates the chief competing route between Chicago and Port-

land, and these two companies would be the ones chiefly affected by the projected amalgamation.

If the proposed merger of the New York Central and Pennsylvania systems should ever be authorised, it would provoke a movement for the amalgamation of the Baltimore & Ohio; Delaware & Hudson; Erie; Delaware, Lackawanna & Western; and Nickel Plate companies into a competing group of almost equal size. The Interstate and various State Commerce Commissions may be compelled to agree to future railway mergers on a large scale as an unavoidable means of enabling the railways to pay their way.

ARGENTINA

Motive Power for Cattle Trains

Because of the poor state of the steam locomotives working cattle trains of the D. F. Sarmiento Railway, delays have caused cancellation of trains and the loss of large numbers of cattle on the hoof. Efforts are being made to work all cattle trains with diesel traction in the future.

Road Connections for Main-Line Trains

Main-line trains of the General Mitre and San Martín Railways are to stop at Miguelete and Sáenz Peña stations, respectively, in Buenos Aires, to con-

nect with the bus services along the General Paz Avenue, which runs from the River Plate to the Riachuelo and marks the border line between the City and the Province of Buenos Aires.

Capital for Railway Works

The Government has granted 850 million pesos to the National Railways for the implementation of railway projects in process of execution.

New Branch

A proposal is under study for the construction of a 75-mile branch of the General Roca Railway between Ayacucho and Mar del Plata. Apart from opening up new country, the line would provide an alternative route for Buenos Aires to Mar del Plata expresses; the distance to be covered is only 10 miles longer than at present.

AUSTRIA

The "Transalpin" Express

The "Transalpin" service of the Federal Railways, which began running by the Arlberg route between Vienna and Zurich, in June, is being maintained by two four-coach streamline trains consisting of second class motor coach, two first class trailers, and a second class coach with driving compartment; seating capacity is 96 pas-

sengers of each class, 192 in all. Passengers are served with meals at their seats from a small kitchen, and a buffet also is provided.

The journey times of 11 hr. 38 min. westbound and 11 hr. 35 min. eastbound are nearly 2 hr. faster than those of the "Arlberg Express." Traction is electric throughout; the Austrian and Swiss systems are both 15,000 V., 16½ cycles.

The motor coaches are of the Bo-Bo type, with a one-hr. rating of 1,120 kW. and a continuous rating of 1,282 kW. in both cases at 50 m.p.h.; the one-hr. tractive effort rating is 12,350 lb. and the maximum speed 81 m.p.h.

WESTERN GERMANY

Improvements on Hamburg Elevated

The single-track branch of the Hamburg Elevated Railway from Volksdorf to Gross Hansdorf, hitherto served by a two- or four-car train every 20 min., has been re-equipped to permit a 10-min. service of six-car trains necessitated by housing development. A new passing station has been constructed at Ahrensburg West, with additional siding accommodation at Volksdorf, and a rectifier substation installed at Schmalenbeck. The branch has been re-signalled with Siemens automatic colour-light signals, controlled from the junction at Volksdorf.

Publications Received

Seit 75 Jahren Fabrik für Eisenbahnbedarf (Seventy-five years in the Manufacture of Railway Equipment). Osnabrück, Germany: A. Rawie. 9½ in. x 6½ in. 65 pp. Illustrated. Obtainable free from London Representative; Dr. E. Székely, Flat 3, 34 Elm Park Gardens, S.W.10.—This well produced booklet describes the development of the manufacture by the firm of Rawie of railway track equipment of various kinds, including the frictional type shock absorbing buffer stops illustrated in our issue of June 7, 1957, sliding rail shoes, derailers, level crossing barriers, with associated devices, ballast spreaders, and so on. An account given of the theory and application of the various designs of frictional buffer stop, used successfully in many Continental countries, is contributed by Dr. E. Grassmann, Professor of Railway Engineering in Berlin, with illustrations and tables of values applicable to varying conditions. Except in a few sidings, no fixed type buffer stops are now in use on the German railways.

British Engineers' Association Handbook.—The 1958 edition of the British Engineers' Association Classified Handbook of Members, embodies nearly 700 pages of reference matter. The Handbook includes a list of members' products classified under product headings, specially arranged to help buyers of engineering equipment. The classified

index is repeated in French, German, Portuguese, and Spanish. It also incorporates an index of trade names and marks. As in previous years, copies will be sent, free of charge, to selected buyers and agents in every country in the world which has business with the British engineering industry.

Prestex Joints.—The 1958 edition of the Prestex catalogue, a review of the compression joints available for joining copper and plastics tubes, has been published by Peglers Limited. Each Prestex joint and fitting is illustrated and alternative sizes and relevant prices are given. Copies are available from Peglers Limited, Prestex House, Marshalsea Road, London, S.E.1.

Wheels for the Plan. Issued on behalf of the Indian Ministry of Railways by the Director, Publications Division, Delhi. 8½ in. x 5½ in. 36 pp. illustrated. No price stated. The foreword of this booklet explains that it is intended to publicise facts about the seriously run-down condition of the Indian railways on the eve of Partition, the desperate staff problems arising from the implementation of that policy, the progress they have since made, the tasks faced in connection with the Second Five Year Plan and the manner in which it is being carried out. The dislocation caused after Partition by the opting of 83,000 Muslim railwaymen—largely engine crews and mechanics—in Hindu India to serve in Pakistan,

and of 73,000 Hindu staff in Pakistan to serve in India, besides vast ordinary refugee movements, is difficult to picture, and is not generally realised. The progress already made towards subsequent rehabilitation has been outlined from time to time in our pages.

Progress in Lubrication.—This booklet of 16 pages briefly records the activities of Alexander Duckham & Co. Ltd., of Hammersmith, London, W.C., over the last few years. It also gives an outline of the technological developments which have contributed to the progress of the company.

A.D.A. List of Publications.—The earlier list of publications of the Aluminium Development Association, comprising information bulletins on practice, application brochures on uses in specific fields, and research reports, has been amplified. A new section named the Symposium Series consisting of six volumes containing papers and discussions on various aspects of aluminium practice and use, most of which arise from events sponsored and organised by the Association, is now included. The list shows 23 published information bulletins, 11 applications brochures, 34 research reports and 72 reprints include certain titles in short supply and now available only on loan. Copies of the list may be obtained on application to the Association, 33, Grosvenor Street, London, W.1.

Seventeenth International Railway Congress

Electric Locomotive Maintenance Practice

Continental practice for inspection and repair of traction motors, transmission, tyres and bearings

THE report on electric locomotive maintenance practice in the French-speaking countries and those which largely follow Continental practice, for consideration at the forthcoming International Railway Congress in Madrid, has been prepared by Sr. Mario Viani, Head of the Electrical Department, Spanish National Railways (R.E.N.F.E.). This is the subject of Question 4 before the Congress. The corresponding report covering English-speaking countries and those in which British practice largely prevails, compiled by Mr. K. J. Cook, Chief Electrical & Mechanical Engineer, Eastern and North Eastern Regions, British Railways, was summarised in our issue of May 9.

Administrations replying to Sr. Viani were as follows: German Federal, Algerian, Austrian Federal, Belgian National, Bas Congo-Katanga, Spanish National, French National, Netherlands, Italian State, Nord-Milano, U.S.S.R., Swiss Federal, Rhaetian, Turkish State, Jugoslav, and Polish State Railways.

A feature of the report is the detailed tabulated information it contains on locomotive types, traction motors and transmissions, pantograph details, grades of lubricant, and qualities of steel used for rails and tyres.

Precise information on the useful life of rails with electric traction was unobtainable, but the Italian State Railways regard the average life in these conditions as 20 years, whereas with steam traction it is 25 years. This is attributed mainly to increases in speed and load with electric haulage. The U.S.S.R. Railways stated that lateral wear with electric traction was five times greater and vertical wear 30 per cent greater than with steam. Reduction in life of rails on electrified lines was estimated by the Austrian Federal Railways as 20 per cent.

Re-turning of Tyres

Mileage between re-turning of tyres is shown to depend largely on the type of locomotive. As an example, the German Federal Railway allows a mileage of 248,550 for its locomotives of classes "E-04," "E-18" and "E-16," of which the first is a 1-Co-1 and the other two 1-Do-1; this is the highest figure quoted. On the other hand the figure for the "E44" Bo-Bo class is 108,740 miles. Generally speaking, the distance is 62,140-124,280 miles. Locomotives are normally taken out of service to have their tyres re-turned, but this procedure is arranged to coincide as far as possible with other periodical overhauls. Some railways, however, have a sufficient stock of

spare bogies to enable the locomotives to be kept in service. On locomotives with three-axle or four-axle bogies, the wear is always much greater and faster on the outer than on the inner axles. The Netherlands Railways report the wear of flanges on the wheels of inner axles to be only about half that on the outer axles. With Bo-Bo or Bo-Bo locomotives there is no appreciable difference in wear between the axles.

Certain administrations reported a definite relationship between wear of treads and flanges, and the type of connection between bogies. The R.E.N.F.E. has observed considerably reduced wear on the outer axles of certain Co-Co locomotives when there is a flexible connection between the inner headstocks of the bogies. According to the S.N.C.F., the influence of such a connection begins to be appreciable when the restoring force is of the order of 10 tons. No definite relationship has been established between type of motor suspension and wear of flanges.

Because of the wide range of duties undertaken by modern electric locomotives, it has not been possible to decide whether any particular type of traffic has an influence on the wear of tyres. The only comment forthcoming on this subject was from the S.N.C.F., which stated that the wear of tyres was about 10 per cent less in locomotives working fast trains than on those used for mixed traffic.

Rail and Flange Lubrication

Automatic rail lubricators are widely used as a means of reducing flange wear. In general they are fitted on curves of small radius, such as 15-25 ch., but on the Belgian National Railways they are found also on curvature of 600 ch. radius, generally sited at the beginning of the curve. The use of British P. & M. type lubricators was reported by the Algerian, Netherlands, and French National Railways, although the last-named administration generally lubricates the rails with mobile lubricators fitted on the locomotives. On the Rhaetian Railway the greasing of flanges by lubricators carried on the locomotives is supplemented by the occasional greasing of the inside of the rail head by means of a truck-mounted manual lubricator operated by permanent staff.

The use of flange lubricators fitted to the locomotives is general, either on all axles or on guiding axles only. All administrations agree on their economic advantages, without being able to give precise figures.

Building up tyres by welding is not resorted to widely, but notes on the

practice were received from the Algerian and the Italian State Railways. The reporter states that the R.E.N.F.E. merely builds up the flanges, seeing that these undergo the most wear because of the many small radius curves on the system. All administrations except the U.S.S.R. Railways remove the axles from the locomotive when tyres have to be turned. No details are given of the method by which such removal is avoided in the U.S.S.R.

Traction Motor Maintenance

Daily inspections of motors are not general, and, when made, are carried out by a driver and an inspector together. On the other hand, overhauls take place every fortnight or month, corresponding to mileage intervals of between 74,600 and 93,200 miles. Further stages in maintenance are periodic inspections every three or four months (12,430 to 31,070 miles), intermediate overhauls every 62,140 to 74,570 miles, and general overhauls after from 149,000 to 373,000 miles.

Intervals at which commutators are trued up are measured either in years or mileage, the figure in the first case being between one and three years, and in the second between 124,300 and 373,000 miles. Practice on the Swiss Federal Railways is an exception, the interval there being as much as 745,000 miles. On the French National Railways the limits are 248,600 to 373,000 miles for d.c. motors, while it is stipulated that the interval must exceed the latter figure for a.c. single-phase, industrial-frequency motors.

Traction motor maintenance and the turning of tyres do not usually coincide, as the tyres require attention at shorter intervals. Often, when a locomotive is out of service for tyre turning, the opportunity is taken to blow through the motor armatures with compressed air.

Only the German Federal Railway among those replying has used modern types of insulation with a silicone or other basis in traction motors, but the French National Railways is now studying the application of such materials to its older motors in order to extend their life.

Cracks in motor armature shafts are of rare occurrence, but certain railways are using ultrasonic or magnetic methods of detecting them. Examinations of this kind are made by the Netherlands Railways after 248,550 miles, and on the Bas Congo-Katanga Railway after 74,600 miles, but many administrations leave them until occasions when other repairs have to be made. Armature bearings are usually examined, and replaced if necessary, in the course of general overhauls, which

in most cases means at intervals of from 124,300 to 497,100 miles. On the French National Railways these examinations of fully-springborne motors are spaced at intervals of from 373,000 to 745,600 miles. None of the administrations which use roller suspension bearings has detected cracks in axles attributable to this practice, nor was any damage to axles or quill shafts reported as a result of current flowing through the bearings. The bearings are occasionally shunted, however, as a precaution against damage to windings by short-circuit current.

In general the cost of repairing nose-suspended motors is shown to be appreciably greater than that for fully-springborne machines, and this is accentuated when speeds exceed 62-74 m.p.h. The French National Railways is satisfied that fully-springborne motors cause less damage to the permanent way and have therefore adopted this arrangement as standard for speeds above 65 m.p.h.

Various measures are recommended for reducing the number of motor flashovers, among those additional to normal maintenance and cleanliness: being constancy of pantograph contact on the overhead wire; use of only one pantograph at speeds above 74 m.p.h.; use of double pans on d.c. systems; and restricting the extent of field shunting, recommended limits being 55 per cent on non-compensated motors and 80 per cent on compensated machines. Detection of wheelspin by special devices or close observation of ammeters is also recommended. Measures for preventing slipping include appropriate shunting of the leading motor in each bogie, and the use of anti-slip relays which automatically apply sand and brake the slipping axle, simultaneously modifying the input to the motor. Usually it is not possible to define particular places where flashovers occur, but the French National Railways and the Austrian Federal Railway report that with nose-suspended motors the trouble occurs most frequently when passing certain track equipment and near current feed points.

Pantographs

A tendency is seen to use carbon as a contact material in pantographs on grounds of long life and favourable current collection characteristics. Various copper alloys have been tried by the Nord-Milano Railway, and the Italian State Railways has also tested a sintered material in order to avoid the temperature rise on the contact line which has been experienced with carbon strips. Lubrication of pantographs is carried out by placing the lubricant in the grooves between the strips, either by the motorman when beginning work or by the depot staff. Only the Belgian National Railways, Algerian Railways, Rhaetian Railways and Swiss Federal Railways make pantograph lubrication a part of periodical inspections or repair procedure.

Renewals of pantograph strips take place usually after mileages of between 37,000 and 50,000, but certain administrations renew as frequently as after 5,000 or 7,500 miles. On the Bas Congo-Katanga Railway the interval is 62,000 miles, representing eight months' service. Information from the Swiss Federal Railways showed that aluminium strips were renewed every 9,000-15,000 miles in winter and 3,700-5,000 miles in summer, whereas with carbon strips renewal was necessary after about 31,000-56,000 miles.

Reports on the effects of different types of service are conflicting, for while the Belgian National and the French National Railways stated that wear was greater in stopping and mixed traffic service than in express work (up to 30 per cent greater in France), the German Federal Railway quotes 30 per cent greater wear on fast vehicles than on slow.

Organisation of Maintenance

Depot inspections are made daily or once in four days. Maintenance operations are classified as intermediate overhauls (120,000 to 190,000 miles) and general overhauls (311,000 to 373,000 miles). There are wide variations in this matter, however, and all administrations do their best to space out the operations as far as possible in order to enjoy maximum use of locomotives. Design is being improved constantly, better quality is stipulated in spare parts, and much attention is devoted to adequate training of the maintenance staff.

Times allotted to the various maintenance procedures are generally as follow:—

	30 to 60 min.	Per cent
Daily inspection	0·08
Summary inspection .. .	3 hr.	0·03
Periodic overhauls .. .	8 hr.	
Intermediate overhauls .. .	10 to 20 hr.	1·95
General overhaul .. .	1 to 2 months	1·93

Care is taken to ensure that all spares required will be available from stock. Standardisation and scientific organisation of the work in the depots and repair shops, together with constant improvements in their equipment, are effectively reducing the time for which locomotives are out of service.

Crew Duties and Common User

All but three of the administrations replying change the train crews during long journeys. Certain railways allocate a locomotive to a small number of drivers—from one to three—but here, too, the practice of common user of locomotives is increasing as the length of the electrified lines increases. Where the practice of allotting a crew to a particular locomotive persists, it is stated that in this way the men have a much better knowledge of their locomotive and the risk of damage is reduced, while, in these particular cases, user of the motive power does not suffer.

Generally locomotives go back to depots only when maintenance is necessary. Stabling takes place usually at stations or in sidings, the latter often

being equipped with inspection pits. Most drivers are recruited from former steam locomotive staff, but some are taken direct into electric locomotive service. In both cases there is a period of technical and practical training, for it has been found that men used to steam traction, either on account of their age, or because of the harder work involved on a steam locomotive, or through lack of technical knowledge, adapt themselves very poorly to the characteristics of electric traction. While suitable training has reduced the numbers of failures in service, no appreciable variation has yet been found permissible in the periods between inspection and maintenance procedures. Drivers' maintenance responsibilities are usually confined to superficial inspection before and after a run, but in the U.S.S.R. a driver undertakes many maintenance operations, including checking and adjusting bearings, axles, gearwheels and transmissions, and replacing brushes, cleaning brush-holders and auxiliary equipment.

Repair Costs Ratio

The reporter has deduced the following average figures for the ratio of maintenance costs to the cost, at 1955 figures, of locomotives:—

	Per cent
Minor maintenance:	
Labour .. .	0·08
Materials .. .	0·03
Heavy maintenance:	
Labour .. .	0·42
Materials .. .	1·13
Intermediate overhaul:	
Labour .. .	1·95
Materials .. .	1·93
General overhaul:	
Labour .. .	3·71
Materials .. .	8·92

Certain railways stated that costs increase with the number of driving axles, and that when rod drive is used they are 25 per cent higher.

SAFE DRIVING AWARDS FOR BRITISH RAILWAYS MOTOR DRIVERS IN INVERNESS DISTRICT.—At Inverness on August 1, Sir Hugh Rose, member of the Scottish Area Board of the British Transport Commission, presented to British Railways motor drivers employed in the Inverness district awards won in the annual safe-driving competition promoted by the Royal Society for the Prevention of Accidents in respect of the year 1957.

ELECTRIFICATION OF LILLE STATION.—Test runs were made on July 30 by a French National Railways special four-coach electrically-hauled train over newly-electrified sections of line in and around Lille-Voyageurs station towards Valenciennes in one direction and Longueau in another. Introduction of electric traction over these sections the following day completes the electrification of the whole main line between Lille and Basle, and that of the Lille-Paris main line as far as Longueau, which is about half-way to the capital. After the electrification of the Longueau-Creil section, due to be completed in November next, to be followed by that of the Creil-Paris section in December, it is hoped that inauguration of throughout electric traction on the Lille-Paris line will take place early in January, 1959.

Repairing Rails Damaged by Slipping Locomotives

Experience in U.S.A. shows that repair by welding is more economical ultimately than replacement of the damaged rails

(By a correspondent)

THE damage done to steel rails by slipping locomotive driving wheels in the aggregate is considerable. If the slipping continues for a sufficient length of time, the heat generated by the friction can raise the temperature of the rail steel to melting point. As soon as slipping ceases, the cooling effect of the atmosphere and the rapid conduction of heat away to the adjacent steel of the rail can have a drastic quenching effect, so that a very hard zone is produced in the quenched area, with minute incipient cracks. These tend to grow under traffic and eventually may cause the rail to break.

Effect of Diesel Traction

If the coupled wheels of a steam locomotive slip badly, each pair of wheels may produce a separate wheel-burn in the rail, with its attendant small depression. With a diesel locomotive having uncoupled motorised axles, only one pair of wheels usually slips at any one time; but because of the smaller dia. of the diesel driving wheels, the depressions produced in each rail by one badly slipping pair of wheels may be deeper.

The problem can be solved in various ways. The rail can be replaced, which is the most expensive; and if the defect is in continuously welded rail, this method is still more expensive, as the affected length must be cut out of the rail, and a new piece of rail inserted and either welded or fishplated at both ends to the remainder of the existing rail. Or the affected length may be built up by welding fresh metal to the running surface. A third method is to grind the surface of the rail down to a depth below the underside of the burn, but this is practicable only with shallow burns, as otherwise it will leave the running surface in an uneven condition. Often the burns are left without any such treatment, to see how they develop under traffic, possibly with the precaution of fish-plating the rail at the affected point in order to give better support to the head. A questionnaire was sent recently to 29 Class I railways in the U.S.A., seeking information on their normal practice in dealing with locomotive burns in rails. Their replies show that there is no uniformity.

The first question concerned the effect that the change from steam to diesel power had had upon the wheel-burn problem. Ten railways reported that wheel-burns had become more frequent, and 14 that they had become less so; seven that the diesel burns are shallower than those caused by steam locomotives; and 14 that they are deeper. One railway reported diesel wheel-burns extending over almost the entire width of the rail head.

In all, seven railways only took no steps to repair wheel-burns by welding; the remaining 22 did weld, but one of these repaired only continuously-welded rails, and not those that had become damaged in ordinary jointed track. Of the railways which do not weld up wheel-burns, one claimed that this was uneconomical; another that the welders might deposit weld metal over thermal cracks, so that the rail would be in no sounder condition than before; a third, if the number and severity of the burns made it inadvisable to leave the rail in a main track, replaced it and re-used the damaged rail in a secondary track. In general, the seven railways which do not weld remove only severely burned rails; in some cases they dress the burns of less affected rails by grinding to a smooth surface. All these railways, however, patrol the rails that have been affected, but not removed, with detector cars, to discover whether or not the incipient cracks produced by quenching are developing to any dangerous degree.

One railway has made a practice of welding wheel-burned rails for the past 25 years, grinding each rail surface down first to sound steel before applying the weld metal. A few only of its repaired rails have failed in service at a later date, and the failure has been attributed to neglect by the welders to grind deep enough to clear the thermal cracks before welding.

Another management assumes that every wheel-burned rail may fail eventually. Directly a wheel-burn is discovered, two-hole fishplates are applied to the affected length before welding. If, later on, the rail should break at the weld, the fishplates hold the broken ends in alignment, and four-bolt plates replace the two-bolt. In this way the full service life is obtained from the damaged rails, and welding of damaged areas can be carried to a greater depth than would be safely possible otherwise. In the opinion of this railway, rails of 131 lb. per yd. weight and heavier will not break in service after wheel-burn damage provided that the repair weld is not more than one-eighth in. deep.

Metallurgical Aspects

An investigation into the metallurgical aspects of the question has been made by the Rail Committee of the American Railway Engineering Association. Falling weight tests conducted on rails repaired by welding did not give satisfactory results, though the removal of the parent metal containing quench cracks and its replacement by weld metal appeared to leave the rails examined in a sound condition metallurgically. This conclusion was confirmed by rolling load tests carried out by the committee, in which specimen rails re-

paired by welding withstood more cycles of testing without fracture than unwelded specimens.

The committee pointed out that the advantages of welding were the elimination of an undesirable microstructure from the steel and in particular of quench cracks, the elimination of low spots in the rail at a point of metallurgical weakness, and the recovery of much rail for main line use which otherwise might be relegated to secondary service or scrapped. Both the laboratory tests and service experience thus appear to show that it is preferable to repair wheel-burns by welding than to leave the damaged rails in the track without welding.

Welding Practice

The general practice in welding is first of all to tamp the sleepers under the affected length so as to reduce rail stresses to a minimum. The damaged metal is then removed from the burned area either by grinding or oxyacetylene torch, before the weld metal is applied; many railways pre-heat the rail before welding, and also apply fishplates in order to keep the running surface as rigid as possible. As the weld metal is applied it is shaped by hammering, and it is a common practice to post-heat as well as pre-heat the rail to relieve stresses in the steel. The final operation is to shape the deposit to the correct rail-head contour by means of grinding.

Some restrict the number of welds permissible in a single rail, or the length of a weld, or the minimum distance between any two welds. The cost of welding varies according to railway and method; one railway reported having repaired 456 wheel-burns at an average cost for labour and material of no more than \$1.25 a weld, but on other lines the cost ranged from \$2 to \$12 a weld, with an average of \$.7. At the figure last-mentioned, repairing up to eight or nine burns per rail would probably be cheaper than replacing it, and would therefore be justified.

Grinding

Eight railways reported having used a grinding train to deal with minor wheel-burns, and thereby to have economised on what would have been the cost of welding every burn. Grinding deals fairly thoroughly with shallow burns, and removes the displaced metal from the rail-head. Five railways had used flexible-shaft, side-angle, or surface grinders to deal with rail-burns, but one reported significantly that it was abandoning this practice in favour of repair by welding, which seems to be the only method on which complete reliance can be placed.

Motive Power Depot at Thornaby, N.E. Region

Provision for dealing with diesel and electric locomotives in new depot serving industrial area on South Tees-side



Straight shed, showing fluorescent lighting in pits

THE motive power depot at Thornaby-on-Tees, in the North Eastern Region of British Railways, opened in June by Mr. Harold Watkinson, Minister of Transport & Civil Aviation, is the largest single project to be completed so far in the Region as part of the railway modernisation plan. The area covered is 70 acres, alongside the main line between Thornaby and Middlesbrough, and the cost was some £1,250,000.

The depot can deal with 220 large locomotives, 40 per cent. of which can be accommodated under cover. It replaces two neighbouring depots, 75 years old and life-expired, at Newport

and Middlesbrough, and also makes provision for increasing traffic arising from the expanding iron, steel, and chemical industries on South Tees-side.

Two Depots Replaced

The obsolete Newport Depot occupied land required for the modernisation of the Tees-side marshalling yards, whilst the cramped and inadequate depot at Middlesbrough, besides being too close to the station platforms for efficient engine movement, could not have been improved except by purchasing adjacent house property at prohibitive cost. Accordingly, powers were obtained for the construction of

the new depot on the 70 acre site alongside the main Thornaby-Middlesbrough road. The Darlington to Saltburn passenger lines which intersected the site were diverted to run south of the depot. This diversion, nearly a mile long, permitted a comprehensive layout for the depot and later, an extension of the diversion will enable new marshalling yards to be provided.

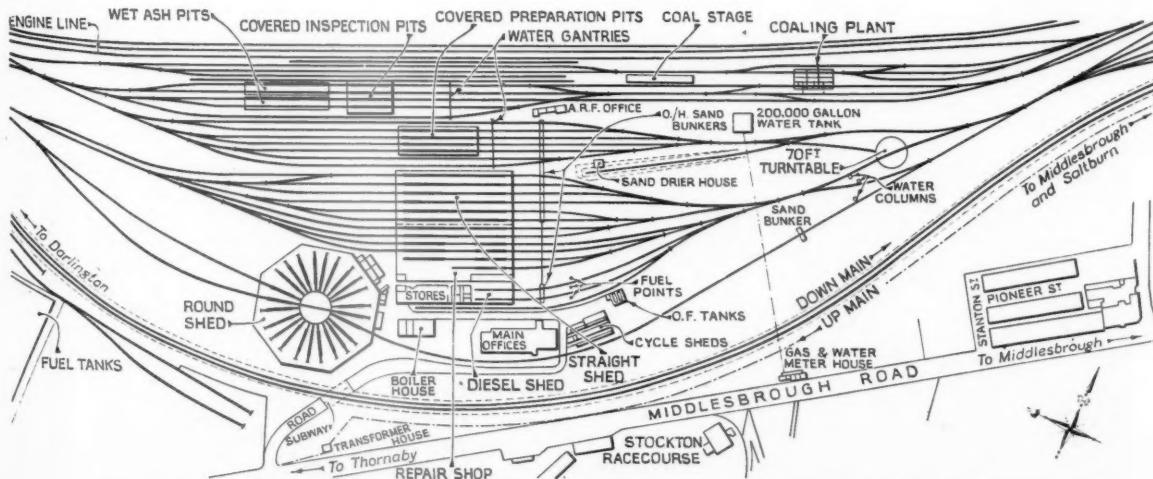
Diesel and Electric Locomotives

The depot will serve steam locomotives for the present, but it has been designed to facilitate easy conversion for use by the largest of the new diesel and electric locomotives when these modes of traction are introduced in this area; electrification is understood to be likely. In the modernisation of rail facilities in this area the traction problem first received attention and the way cleared was for the replacement of the adjacent manually-worked marshalling yards at Newport by a modern, mechanically-operated yard.

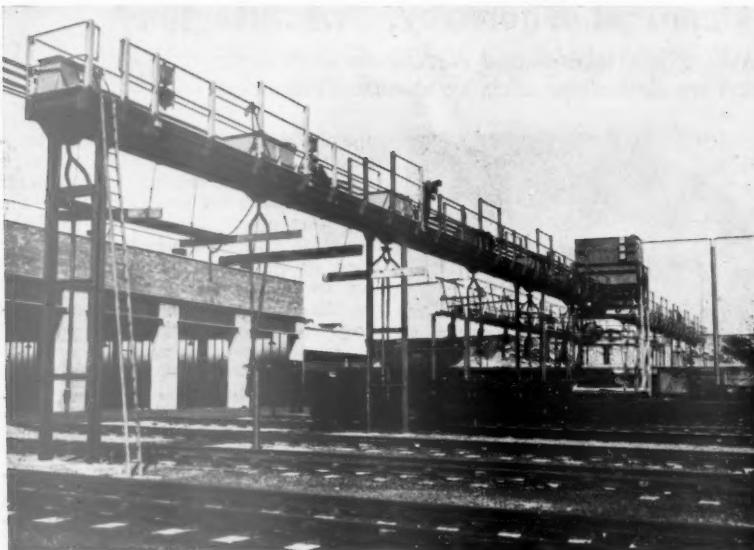
The depot includes a large octagonal shed almost 100 yd. in dia., with 22 stalls radiating from a 70-ft. electric turntable, a straight shed with six roads 265 ft. long, and a repair shop with five roads of similar length. All these are built mainly of reinforced and pre-stressed concrete to reduce maintenance costs to a minimum.

Coal, Water and Sand Supplies

There is also a mechanical coaling plant with a coal capacity of 350 tons capable of coaling four locomotives simultaneously, a 70-ft. high 200,000-gal. water storage tank with pipe distribution to 15 water points, and a high pressure water system for washing out boilers. The depot also embodies an overhead electronically



Depot in relation to adjacent running lines, showing servicing facilities arranged in planned sequence



Sanding gantry, showing flexible tubes

controlled sanding system whereby dry sand is blown through pipes to serve 16 tracks.

For the examination of incoming locomotives there are four covered inspection pits, and for locomotives about to return to traffic there are five covered preparation pits. A second 70-ft. electrically-driven turntable has been provided on the exit line at the east end of the depot.

Colour-Light Signalling

The opportunity has been taken to install complete colour-light signalling with track circuiting and electric point detection at Thornaby East controlling the entrance to the new depot, and to install similar signalling on the main

lines between Thornaby East and Newport East.

In the case of the octagonal shed, opportunity was taken to re-use 87-ft. long Warren girders recovered during the recent modernisation of Bradford Forster Square Passenger Station. It was found that these wrought iron girders were in exceptionally good condition after some 70 years exposure to engine fumes and weather.

The roof construction of the straight shed, the repair shop, and the small depot for diesel shunting locomotives consists of pre-stressed concrete main beams and secondary trough beams with concrete walkway slabs and a high percentage of patent glazing. For smoke extraction continuous bitumen

coated asbestos cement smoke chutes are provided over all tracks in the straight shed while in the octagonal shed there is a smoke chute for each locomotive.

Construction of Sheds

The main beams are made on the post-tensioned Lee McCall system and the trough beams which take the rainwater and carry the walkway slabs, the smoke chutes and the patent glazing, are on the pre-tensioned "long line" system. The main beams are carried on reinforced concrete columns connected by *in situ* foundation and eaves beams with adequate patent glazing and brick panel walling.

The shed foundations are continuous bases amply spread to reduce the intensity of ground bearing pressure, but certain heavy point loads occasioned by the elevator water storage tank, the coaling plant and the turntables are carried on 45-ft. pre-stressed concrete piles. The wet ash disposal pit is of the box type and here reinforced concrete sheet piles provided a water retaining structure and incidentally greatly facilitated the removal of the earth core.

Repair Shop

The repair shop is equipped with two wheel drops, a wheel lathe and ancillary machine tools. Also there are six portable weighing machines for weighing locomotives on specially constructed pits.

The wheel drops are of two types, one with a traversing table and the other non-traversing. Locomotive wheels are conveyed from the wheel drops in a common tunnel by means of a trolley and lifted by an overhead 7½-ton crane which covers the wheel lathe, wheel drop shaft and wagon road. This crane is fitted with earth



Left to right: combined repair shop and straight shed; covered preparation pits; and covered inspection pits

proving and monitoring equipment to protect the operators.

In the air compressor house there are two fully automatic air compressors having a capacity of 270 cu. ft. of free air a min. at 100 lb. per sq. in. pressure; one compressor acts as a standby to the duty machine. In the event of failure of the duty compressor, the standby comes in automatically. Air-lines from the reservoirs to supply points are 2-in. bore heavy gauge polythene pipes which are carried underground, embedded in sand.

Sanding Equipment

Sand dispensing points on the east side of the straight sheds are provided from a gantry supporting 16 small hoppers of one-ton and $\frac{1}{2}$ -ton capacity with a large hopper of 18-ton capacity in the centre feeding the smaller hoppers. There is also a gantry supporting two 2-ton hoppers on the round shed outlet road adjacent to the outside turntable. The distance from the sand house to the 2-ton hoppers is approximately 510 ft. and from the sand house to the main 18-ton hopper approximately 160 ft. The smaller one-ton and $\frac{1}{2}$ -ton hoppers are at distances varying from 14 to 290 ft. from the main 18-ton hopper.

Pneumatic conveyance uses air from the compressed air mains. The operational sequence is that wet sand, unloaded by hand from wagon to storage hopper is fed to sand driers, after which the dried sand is blown from the storage hopper situated in the basement of the sand house to the main 18-ton hopper and 2-ton hoppers, control of blowing of sand being automatic.

In the sand house there is continuous indication on a console of the supply position at each of the hoppers. The pipelines from the sand house to the various hoppers are of steel and so designed and run out as to keep the bends in the pipes, wherever possible, to a long sweeping radius of 20 ft. The down pipes from the hoppers to feed the locomotives are armoured rubber with steel dispensing nozzles each fitted with a valve opened by a small side lever to obtain sand delivery.

The console which indicates the level of the sand in the hoppers is in the form of a diagrammatic layout of the pipework and hoppers and there is colour light indication to show red when the hopper has reached a point when sand should start blowing; white shows that the sand is blowing; and green when the hopper is full. For normal operation the system works automatically. There are, however, push buttons to enable the operator to take over manual control.

Water Supply

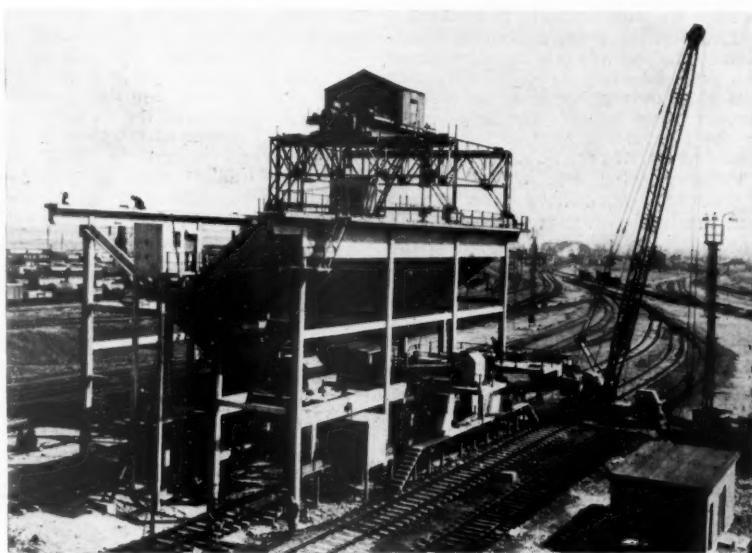
Water supplies are taken from the Tees Valley Water Board and fed into the 200,000-gal. tank for distribution to the various water points. In front of the preparation pits at the main shed there is a battery of seven watering points on a steel gantry and a gantry supporting five watering points is in

front of the covered inspection pits. The 350-ton coaling plant has two hoppers, one of 250-ton and the other of 100-ton capacity. The design is such that the wagons of locomotive coal are placed on a cradle which is raised to the top of the plant, the wagon and cradle are then lifted out of the guides and traversed by an overhead crane to the hopper into which the coal has to be tipped.

The whole operation of the wagon

There is an oil store for lubricating oils, with storage tanks for each type of lubricant required. The supplies of oil to keep these tanks up to capacity are pumped electrically into the tanks as required.

Certain of the oils have a very high viscosity and in cold weather it is necessary to keep them at a temperature which will allow of easy flow. Therefore, under the main storage tanks there are heating banks consisting of tubular



Mechanical coaling plant of 350 tons capacity under construction

cradle is carried out from an elevated cabin which gives the operator an uninterrupted view of both hoppers and the area over which he is working. The hoppers are built on the anti-breakage principle and so designed that there is a minimum distance for coal to fall.

From the hoppers to the locomotives the feeding is carried out by means of four feeders fitted with rubber conveyor belts. The feeders are controlled by the engine crew and are operated by push button.

The wet ash pit serves four roads and caters for 16 locomotives discharging ash simultaneously. The damped ashes are removed from the pit and then loaded into wagons by means of a grab crane.

Diesel Maintenance

Facilities for minor maintenance of diesel shunting locomotives include lubricating oil dispensing equipment, de-greasing, battery charging (portable and fixed), injector testing equipment, and a one-ton overhead crane to facilitate loading of equipment. There are also two fuelling arms which are fed from two fuel storage tanks, each of 7,000 gal. capacity. The flow of diesel oil from the dispensing arms is at the rate of 60 gal. per minute. The storage tanks can be filled from either road or rail vehicles, pumping equipment being provided.

electric heaters and on the delivery pipes there are low temperature electric heating cables to keep the oil in those pipes at a temperature which will give ease of flow.

Depot Operations in Sequence

The layout of the depot is designed that all operations which the locomotives, returning to the depot from traffic, require, are in sequence. All locomotives enter the depot at the East end on one set of tracks and depart from the same end of the depot on different tracks, having progressed through the depot anti-clockwise, without any conflicting movements.

The sequence of servicing and maintenance operations is that locomotives on entering the depot proceed in a westerly direction, obtain coal, then water, and are examined in the inspection shed. This examination, in conjunction with an examination of the driver's repair card, decides whether casual maintenance is required, and thus whether the locomotive should have the fire cleaned and proceed to the preparation pits, or whether it should be stabled in either the roundhouse or straight shed for minor attention prior to subsequent working.

In the case of the inspection or the driver's report revealing a major defect, or if the locomotive is scheduled for periodic examination or boiler washing,

the fire is thrown out and the locomotive stabled in the roundhouse, straight shed, or the repair shed, depending upon the nature of the work required.

This arrangement of early inspection and examination of the drivers' reports ensures that locomotives are, as far as ever possible, stabled in the correct place, and the problems, well known to all motive power men, associated with having to shunt out locomotives found defective on inspection after stabling (except in roundhouses) are avoided.

Locomotives proceed after examination to the wet ash pits for attention to the fire, and after leaving the wet ash pits they then proceed in an easterly direction with full selection to go either to the preparation shed, straight shed, round house, or repair shop.

After stabling and any necessary maintenance work have been carried out, the locomotives are prepared and proceed in an easterly direction to the departure sidings, on the way obtaining supplies of sand and water if required, and turning if necessary.

Besides tracks provided for this normal sequence of operations, adequate by-passing facilities to cut out any operation not required to a particular locomotive are provided so that locomotives from traffic can pass through the depot and be made ready for further traffic service in the shortest possible time.

Administrative Processes

Just as every effort has been made to get a logical sequence of operations for dealing with the locomotives, so have the administration and staff amenities been planned to provide a similar progression for the staff signing on and off duty.

The ground floor of the administration and amenities block in addition to providing certain office accommodation and a first aid room, also provides the following facilities, proceeding in a westerly direction, in the order shown: time office, notice case room and circulating area, with locker room and messroom leading off, exit from messroom, also provided to the locker room which leads to a passage off which are the ablutions facilities, including showers, a drying room and lavatory accommodation.

On leaving this building, about 20 yd. on the right is a passage leading past the stores, still proceeding in a westerly direction this passage terminates at the most central point for all the various sheds, and so on, forming the working portions of the depot.

The order of progression mentioned is for men signing on duty, but men signing off duty follow the same progression in an easterly direction, that is, hand in stores, ablution facilities, drying room, locker room, messroom and/or circulating area, time office.

Administration Building

The administration and amenities building is a composite construction of pre-cast concrete framing and brick-work, with pre-cast exposed aggregate

panels and aluminium curtain walling, with coloured glass infill panels. The block is heated by means of embedded floor panels on a low pressure hot water system.

Staff Accommodation

A portion of the building is of two-storey construction; the first floor accommodating the shedmaster and administrative staff with a class room for staff training. The shedmaster's office is placed to give a wide view of the depot. Adjacent to the administration and amenities building are cycle sheds which include accommodation for auto and motor cycles. Messrooms, locker rooms, and ablutions are also provided adjacent to the repair shops for the staff employed there.

Road access is provided from the Thornaby-Middlesbrough road by a box-type reinforced concrete subway under the diverted passenger lines. This incorporates separate paths for pedestrians, cycles and motor vehicles.

The whole of the heating and hot water for the depot is supplied from a central boiler house containing two oil fired boilers each with an output of 4,000,000 B.Th.U. per hr. and capable of increased capacity if this should be necessary in the future.

Electric Supply

The electricity supply is taken from the North Eastern Electricity Board at 11 kV. and fed into a main substation at the entrance to the depot. This substation feeds a second substation at 11 kV. which is situated at the Newport end of the depot. The total connected load of the depot installation is 679 kW. In the main substation there is a transformer of 500 kVA capacity, 11,000-415 V., and in the second sub-station a transformer of 150 kVA.

All cabling is underground, and because of the make-up of the site, the cable used is multi-core, paper insulated, lead alloy sheathed, served, singled-steel wire armoured and P.V.C.-sheathed overall.

Lighting

The electric lighting has been designed to modern standards and the fittings are in many cases built into the general design of the buildings to give clean lines with pleasant appearance. All engine pits are fitted with fluorescent lighting and the fittings, which are built into the side walls of the pits, have been designed to be dust and water-tight.

The lighting in the octagonal shed is by metal filament lamps in totally enclosed fittings, each fitting taking one 500-W. lamp. Steam locomotives will be dealt with here for some time and this type of fitting has been used because it is dust-tight, all the cleaning required is on the outer glass.

The depot yard is floodlit by three light clusters mounted on Tubewright steel masts at a height of 50 ft. above ground level. The steel masts have permanent ladders and platforms at the

top to facilitate maintenance and provide maximum safety for staff carrying out this work. The lighting clusters consist of three fittings spaced 120 deg. apart and each fitting takes one 400-W. colour corrected mercury vapour lamp. The tower method of lighting has been designed to give an even illumination in the yard as free from glare as possible. In the wet ash pit area the lighting is provided from 30-ft. Tubewright masts with flood light projector fittings of 750-W. capacity.

A telephone exchange with an inter-communicating telephone system has been installed to provide adequate telephone services throughout the various sheds and offices and an electrical pulsynetic clock system has also been provided.

Contractors

The main contractor for the round and straight sheds, buildings, roads and water services, and so on, also erection of the administration and amenities block, was Charles R. Price, of Doncaster.

Principal sub-contractors include:

Earthworks and drainage, A. Robinson Limited
foundations to sand and water gantries and lighting columns, erection of fencing

Pre-cast concrete framing Tarslag Limited

for administration block, main stores block, boiler house and fuel store, fitters' shop and store, erection of fitters' shop and store; foundations for fuel tanks, fuelling points and duct work; erection of two new substations and gas and water meter building
Construction of wet ash pits, foundations and piling

Yorkshire Hennebique Contracting Co. Ltd.
S. Butler & Co. Ltd.
Newton Chambers & Co. Ltd.

L. C. Abdale Building Contractors Limited
L. Fairclough Limited

E. Davis (Fixers) Limited
Ridghouse Limited, Aycliffe Trading Estate

Richardson & Co. Ltd.
Brightside Engineering Co. Ltd.

H. Morfitt & Son
Henry Lees & Co. Ltd.
Cowans Sheldon & Co. Ltd.

Wharton Crane & Hoist Co. Ltd.
Alley & Macellan Limited
Smith Bros. & Webb Ltd.

Fielden Electronics Limited,
James Kilpatrick, & Son Ltd.
Crompton Parkinson Limited

Bryce Electric Construction Co. Ltd.
A. Reyrolle & Co. Ltd.
Ferguson Pailin & Co. Ltd.

M. V. switchgear
A. Reyrolle & Co. Ltd.
English Electric Co. Ltd.

Hoisting facilities
Paterson Hughes Engt. Co. Ltd.
Herbert Morris Limited

RAILWAY NEWS SECTION

PERSONAL

Dr. F. T. Barwell, Senior Principal Scientific Officer, Department of Scientific & Industrial Research, has been appointed Electric Traction Engineer (Research), Electrical Engineering Department, British Railways Central Staff.

Sir Ralf B. Emerson, who as recorded in our July 18 issue, has handed over the

Limited, Dow-Mac (Construction) Limited, Dow-Mac (Plant & Transport) Limited, Dow-Mac (Quarries) Limited, and Dow-Mac (Products) Limited, and Joint Managing Director of Brooke Marine Limited. He was appointed first Chairman and General Manager of the Nigerian Railway Corporation on its formation in 1955, and was awarded a Knighthood in the Birthday Honours List of 1956. Sir Ralf Emerson retains the appointment of

Mr. R. K. Innes, D.L.C., M.I.C.E., M.I.Mech.E., M.I.L.E., Chief Mechanical Engineer, Nigerian Railway Corporation, who, as recorded in our July 18 issue, has taken over as General Manager, received his early training with the Great Western Railway when he entered the Swindon Works in 1915. Between 1917 and 1919 he served with the Royal Naval Air Service. He returned to Swindon in 1923, after obtaining the Loughborough College



Sir Ralf Emerson
Chairman & General Manager, Nigerian
Railway Corporation, 1955-58



Mr. R. K. Innes
Appointed General Manager, Nigerian
Railway Corporation

office of General Manager, Nigerian Railway Corporation, to Mr. R. K. Innes, was born in 1897. He was educated at Bradfield College and the Royal Military Academy, Woolwich, which he joined from the ranks of the Royal Flying Corps in 1917. He was commissioned in the Royal Engineers in 1918, and served at home, in India, and in Iraq until 1927. He then transferred to civil employment with the Great Indian Peninsula Railway, and was appointed to officiate as General Manager of that system in 1939. Subsequently reverting to military duty, he was released to take up the appointment of General Manager of the same railway in 1944. Sir Ralf Emerson became Chief Commissioner of Railways in 1946. He attended the International Railway Congress at Lucerne in 1947, and retired from the Railway Board later the same year. In 1948, he joined the boards of the associated companies in the Dowsett group and was appointed Deputy-Chairman of Dowsett Engineering Construction

Chairman, and will live in England, visiting Nigeria as required for Corporation meetings. He recently has been appointed a director of the West African Provincial Insurance Co. Ltd. of Nigeria. Editorial reference to Sir Ralf Emerson is made elsewhere in this issue.

Sir Wilfred Neden, Chief Industrial Commissioner, Ministry of Labour, is retiring on August 24; he will be succeeded by Mr. P. H. St. John Wilson, Under-Secretary of the Industrial Relations Department.

NEW B.T.C. APPOINTMENT

The British Transport Commission announces the appointment of Mr. D. S. M. Barrie, previously Chief Public Relations Officer, as Assistant Secretary General, B.T.C. This appointment forms part of a reorganisation effecting the abolition of the position of Chief of General Duties and the absorption into the Secretary General's office of the General Duties Department.

Diploma in the Faculty of Mechanical & Civil Engineering. In 1923-24 he commanded the Hampshire (Fortress) Company G.W.R., Royal Engineers Territorial Army. Mr. Innes joined the Bombay, Baroda & Central India Railway as an Assistant Locomotive & Carriage Superintendent in 1924 and became Works Manager, Parel, in the same year. In 1933 he was appointed as the B.B. & C.I.R. observer to the Pope Enquiry Committee. In September, 1939, he was nominated by the Railway Board to serve on the Staff of the Master General of Ordnance as Chief Industrial Planning Officer, to organise surveys and the collation of capacities of the Indian Railway Workshops and civil industry for munitions production and held successively the posts of Assistant Director, Deputy Director and Director Civil Production (General). On rejoining the B.B. & C.I.R. he was appointed Deputy Locomotive & Carriage Superintendent (Broad Gauge). In 1948 the hitherto distinct broad- and metre-

gauge locomotive and carriage departments were amalgamated and Mr. Innes became Chief Mechanical Engineer, with responsibility for workshops and running spheres. He served on the Locomotive Standards, Carriage & Wagon Standards and operating committees. In 1932 he was appointed J.P. Mr. Innes retired from the Indian railway service in 1951, and was appointed Chief Mechanical Engineer, Nigerian Railways in 1954.

Mr. Charles Boyaux, Director General, French National Railways, who, as

tariffs on a simpler and more flexible basis, better related to the cost of the service provided, so as to cope with the increasing degree of road competition. He was also responsible for important changes which have resulted in the modernisation of the French railway system, especially the acceleration of goods and parcels transits and deliveries, the unification of *grande* and *petite vitesses*, and the placing of relations between the railways and railway users on a normal commercial basis. Mr. Boyaux was appointed Assistant General Manager of the S.N.C.F. in 1946,

Mr. Philippe Dargeou, Deputy General Manager, French National Railways, who, as recorded in our June 13 issue, has been appointed Director General, was born in 1898, at Angoulême (Charente). Mr. Dargeou was educated at the Ecole Polytechnique. He joined the Mediterranean Railway in October, 1925. He was responsible for the co-ordination of passenger traffic in 1934-35, and became Assistant Traffic Superintendent in 1937. He was appointed Chief of Passenger Operation, Operating Department, on the foundation of the S.N.C.F. Mr. Dargeou became Traffic



Mr. Charles Boyaux
Director General, French National
Railways, 1955-58



Mr. Philippe Dargeou
Appointed Director General,
French National Railways

recorded in our June 13 issue, has resigned, was born in 1896 in Rive-de-Gier (Loire). At the age of 18 he enlisted in the army as a volunteer on the outbreak of the 1914-18 war, in which he ended his military service with the rank of Lieutenant. He then studied at the Ecole Polytechnique, from which he passed out second, and later at the Ecole Nationale Supérieure des Mines, where he qualified as Ingénieur au Corps des Mines. During the occupation of the Ruhr by the French forces in 1923, Mr. Boyaux was a member of the engineering mission. At the end of that year he entered the service of the Paris Lyons & Mediterranean Railways Company, in which he held several positions in the operating department, and was acting as Ingénieur en Chef à la Direction in 1937. In January, 1938, on the formation of the French National Railways, he was selected as Chief of Commercial Services. He played a considerable part in promoting a vigorous commercial policy, more particularly in the complete revision of

and Director General in 1955. Mr. Boyaux has now become Director General "Honoraria." As Vice-President of Cie P.L.M. he is on the board of S.N.C.F. Mr. Boyaux was made a Commander of the Legion of Honour in 1948.

Mr. W. R. Smith, Staff Assistant to the Chief Mechanical & Electrical Engineer and Carriage & Wagon Engineer, Doncaster, Eastern & North Eastern Regions, British Railways has retired after nearly 47 years of service.

Mr. J. A. Bennett, Assistant Purchasing Agent, London, Canadian Pacific Railway, has retired.

Mr. J. Strong, an Executive Director of the British Oxygen Co. Ltd., has been elected President of the Institute of Welding for 1958-59 in succession to Sir Charles Lillicrap. Mr. A. Clifford Hartley, Mr. G. Roberts and Mr. E. Seymour-Semper have been elected Vice-Presidents.

Superintendent, Eastern Region, S.N.C.F., shortly before the war. In October, 1940, he returned to the Headquarters Operating Department as Assistant to the Director, and had to deal with the many problems connected with rail transport during the period of the Occupation. Soon after the Liberation, he became Director, Headquarters Operating Department, and, in conjunction with the Allied Armies, co-ordinated the rehabilitation of the devastated French railways. Later he was concerned particularly with the planning and organisation of the present passenger service, new methods of dealing with goods traffic, the introduction of the "Europ" goods wagon pool and more recently still, the introduction of two classes only for passenger traffic. Mr. Dargeou became Deputy General Manager in February, 1955. He is a Commander of the Legion of Honour and holds the Medal of Freedom.

Mr. R. G. Elliot has resigned from the Board of Allied Ironfounders Limited.

**Mr. M. A. Henstock**

Appointed Assistant Supplies & Contracts Manager, London Midland Region

Mr. M. A. Henstock, B.Sc.(Eng.), who, as recorded in our July 4 issue, has been appointed Assistant Supplies & Contracts Manager, Euston, London Midland Region, British Railways, entered the service of the Midland Railway in 1920 as a privileged apprentice at Derby Locomotive Works. In 1925 he took his B.Sc.(Eng.) examination at the University of London, and in the same year was appointed a draughtsman in the Locomotive Drawing Office. In that capacity he was engaged also in experimental work and took charge of the dynamometer car tests on many parts of the former L.M.S.R. system. In 1935 Mr. Henstock was appointed Mechanical Inspector at Euston, and transferred to C.M.E. Headquarters. During the war period he was mainly dealing with Government work which was being executed in the various workshops of the company. He was appointed Senior Mechanical Inspector to the Chief Mechanical Engineer at Derby, in 1943, and in 1944 was transferred to the Locomotive Works at Derby as Assistant to the Works Superintendent for Maintenance of Locomotives. He was appointed Assistant Works Superintendent, Derby Locomotive Works, in 1948.

Mr. F. B. Lawrence has been appointed representative in South-West England, and Mr. J. N. Revil in South Wales, for Ruston-Bucyrus Limited.

Mr. W. Clark, Works Director, John Bull Rubber Co. Ltd., has been appointed to the board of Metalastik Limited.

Mr. Edwin Barnard, Manager Excavator Department, Ransomes & Rapier Limited, has retired.

Mr. M. M. V. Custance has been appointed a Deputy Secretary, Ministry of Transport & Civil Aviation. He succeeds Mr. A. H. Wilson, who has retired and is taking up an appointment in the Ministry as Adviser on Commercial Air Transport.

Mr. Robert Arnold Slater has been appointed Stationmaster, Kings Cross, in succession to Mr. F. W. Goring, whose retirement was recorded in our July 4 issue.

Maj.-General G. W. Hodgen has been appointed a Member of the Transport Users' Consultative Committee for the West Midland Area as one of the four members representing industry, in place of Mr. F. D. Scott Walker, who has resigned. Maj.-General Hodgen is Transport Manager of Mitchells & Butlers, Limited, Birmingham.

Mr. E. W. Craig has been appointed Member of the Transport Users' Consultative Committee for Scotland as one of the two Members representing labour. He succeeds Mr. F. Donachy who has resigned. Mr. Craig is a Member of the General Council of the Scottish Trades Union Congress and Scottish Divisional Officer of the Union of Shop, Distributive & Allied Workers.

County Alderman G. W. Hutson, of the Lincolnshire (Parts of Kesteven) County Council, has been appointed a Member of the Transport Users' Consultative Committee, East Midland Area, to represent local authorities. He succeeds County Councillor Nightingale who has resigned.

British Road Services announces the following appointments:—

Mr. R. G. Davies, Divisional Traffic Officer, North Western Division, as District Manager, Liverpool District, North Western Division; Mr. C. Walton, District Traffic Superintendent, Preston District, North Western Division, as Divisional Traffic Officer, North Western Division, Manchester.

Mr. Stanley Bartlett, Assistant Traffic Manager, Hants & Dorset Motor Services Limited, Bournemouth, has been appointed Traffic Manager. He succeeds Mr. D. W. Morison, who was recently appointed General Manager. Mr. S. E. Gwynnall, Schedules Superintendent, becomes Assistant Traffic Manager.

Mr. F. K. Pointon, General Manager of Hebble Motor Services Ltd., has been appointed General Manager of the East Midland Motor Services Limited in the place of Mr. S. J. B. Skyrme who, as previously recorded, is succeeding Mr. C. W. Wroth as General Manager of the Potteries Motor Traction Co. Ltd.

Sir Charles Geddes, who is a part-time member of the London Transport Executive and a former President of the Trades Union Congress, has been created a Baron in the first list of Life Peers.

Dr. J. B. Higham has been appointed to the new post of head of Technical Development by Pilkington Bros. Ltd., the glass manufacturers. He will be responsible for the creation of a centralised department to co-ordinate and expand technical development in all the company's works.

Mr. C. M. Squarey has been appointed General Manager of Ocean Travel Development, and consequently has resigned as Chairman of the Steamship Committee, Association of British Travel Agents. Mr. A. K. Galloway, of Frank Bustard & Sons Ltd., has been elected chairman.

Mr. J. E. Sunderland has been appointed Managing Director of Enfield Cables Limited.

Mr. W. W. Cooke, Lighting Representative, South-East Region, Philips Electrical Limited, has retired.

**Mr. A. G. Minty**

Appointed Line Traffic Officer (Motive Power), Crewe, London Midland Region

Mr. A. G. Minty, who, as recorded in our July 4 issue, has been appointed Line Traffic Officer (Motive Power), Crewe, London Midland Region, British Railways, was educated at Brighton College and joined the former L.N.E.R. in 1922 as a premium apprentice at Doncaster. From 1924 to 1926 he was a pupil of the late Sir Nigel Gresley, former Chief Mechanical Engineer, L.N.E.R., finishing his training at Doncaster in 1926. After filling various positions, Mr. Minty was promoted from Locomotive Inspector to Locomotive Shedmaster and had charge of Melton Depot and, later, Hartlepool Depot until 1934. He held joint supervisory positions of Locomotive Shedmaster and Stationmaster at both Alnmouth and Whitby, and, in 1939, was appointed Assistant District Locomotive Superintendent at Newcastle. Five years later he was transferred to Sunderland as Acting District Locomotive Superintendent, and, in 1945, became District Motive Power Superintendent, Hull. Mr. Minty was appointed District Motive Power Superintendent, Willesden, in 1950, and became Divisional Motive Power Superintendent, Manchester, London Midland Region, in 1955.

Dr. C. J. Dadswell has been elected Chairman of the British Steel Founders' Association in succession to Mr. G. M. Menzies. Mr. C. H. Kain succeeds Dr. Dadswell as Vice-chairman.

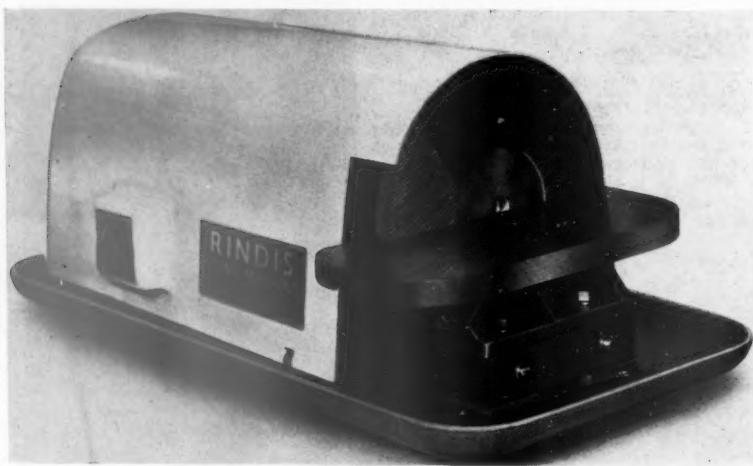
The second award of the Commercial Motor Users' Association Road Transport Research Fellowship has been made by the Institute of Transport to Mr. A. Burrows, A.M.Inst.T., General Manager & Engineer, Lancaster City Transport.

Mr. A. L. G. Lindley, an Assistant Managing Director, General Electric Co. Ltd., has joined the board of the Motherwell Bridge & Engineering Co. Ltd.

Mr. G. A. Dwyer has been appointed Assistant Export Sales Manager, Marconi Marine Communication Co., Ltd.

Mr. P. M. Talbot, Overseas Technical Representative, Expandise Limited, is making a business tour of Africa.

NEW EQUIPMENT AND PROCESSES



Filing Machine

ANOTHER model has been added to the range of Rindis power disc filing machines. This is of 10-in. size, model RD.58/10, and is available either in bench or pedestal version.

Existing types of Lorant filing discs with the various teeth arrangements suitable for any type of material can be used on this machine.

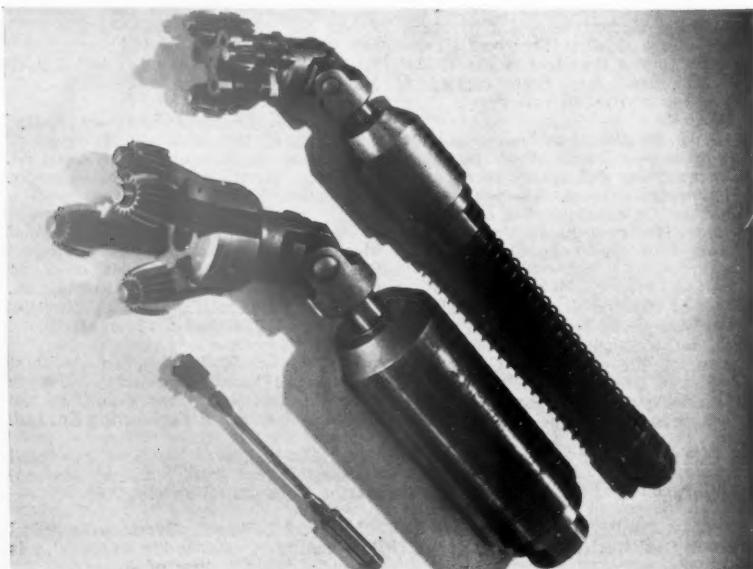
The gearbox has precision-cut gears and bearings for radial and thrust loads on the spindle. An inclinable work table which is adjustable towards the disc, gives alternative height positions necessary to accommodate work of varying thicknesses. The complete unit is mounted on a substantial tray; the cover acts as a guard to the disc and also houses a rotary switch.

Features of the filing disc include a double-sided design with the teeth ex-

tending to the periphery and on the periphery face itself when necessary. These facilitate the filing of work across the complete face or at the corners.

The discs remove material four to six times faster than is possible by hand, and operate without heat, abrasive or coolant. No clogging is experienced and their shape is retained without redressing. When the cutting edges are dull, discs can be repeatedly resharpenerd very cheaply. The wide variety of teeth arrangements available ensures a high efficiency on metals and plastics.

Two-speed models are available as standard; the machine can be supplied with any individual speed between 80 and 480 r.p.m. It can also be supplied with bar feed attachments for the automatic generation of particles from various types of metals. A pedestal with three shelves is available as an extra. The height of the machine is 11½ in.; it weighs 200 lb.



The price is from £65. Further details may be obtained from the manufacturer, Lorant & Co. Ltd., 98-100, Croydon Road, London, S.E.20.

Welding Electrodes

TWO electrodes for specialised welding operations have been introduced. One of these, known as the Mangcross (New Type) electrode is designed for strength welding manganese steel, for welding other steels to manganese steel and for reinforcing worn carbon and manganese steel parts.

It is recommended for repair of fractured and worn crossings, dredger bucket lips, reinforcing crossings of carbon steel rails, reinforcing pulverisers, excavator teeth and so on. The electrode deposits an austenitic nickel-chromium-molybdenum steel which is tough and ductile and comparatively soft when deposited, with a hardness of 250 V.P.N. Under abrasion and impact conditions the deposit rapidly work-hardens to approximately 500 V.P.N., but the reinforcement retains its toughness, thus avoiding "spalling," or fracturing in service. It is fully extruded, superseding the previous dual flux covered type. The new covering gives a quieter arc and superior slag detachability, especially on fillet welds, besides higher current carrying capacity. The electrodes are available in sizes 10, 8 and 6 s.w.g. and is suitable for use with a.c. or d.c. (electrode positive).

The other electrode is the Armoid No. 1 (New Type), designed for the downhand welding of nickel-chromium-molybdenum and armour plate. It is fully extruded, also superseding the original dual flux covering. It is available in sizes 12 s.w.g. to ½ in. dia. and is suitable for welding with a.c. or d.c. supply.

Further details may be obtained from the manufacturer, Quasi-Arc Limited, Bilton, Staffs.

Tube Cleaning Equipment

ARANGE of tube cleaning equipment, with the trade name Lagonda, is now available. The range includes three sizes of vane type motors designed to operate a variety of cutting heads for dealing with straight or curved tubes from ½ in. to 6 in. or more internal dia.

Railway applications include the cleaning of locomotive boiler tubes, sludge removal from diesel oil fuel pipes and water mains, and the removal of metal nodules on spun cast iron pipes.

A selection of cutter heads and brushes is available. All heads, however, are variations of straight and trackless cone cutters in which spacing of cutter teeth or blades is so arranged that any one tooth does not return to the same point in a tube in successive revolutions of the head. This prevents the formation of a tooth design in the tube and ensures an even finish; cutters and other head parts are heat treated. For straight tubes, the cutter heads are direct coupled to the shaft of the motor used; to obtain flexibility in curved tubes, a universal joint is used between the cleaner motor and the cutter.

For hard deposits in very small, straight or curved tubes, a simple threaded cone

cutter is used with a 600 series motor through a universal coupling or a flexible holder.

Special scraper heads for soft, gummy or oily deposits, and expanding brushes to deal with very light deposits, have also been designed.

For use with the 1300 series motors, for such jobs as removing boiler scale and other general work, a short surface swing frame type self cleaning head will generally be found sufficient.

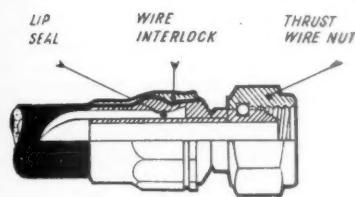
The accompanying illustration shows (left) the 600 series, (centre) 1300 series, and the 1100 series motors. Corresponding heads are the circular brush, pivoted arm and swing frame types respectively.

Details may be obtained from the manufacturer, Consolidated Pneumatic Tool Co. Ltd., 232, Dawes Road, London, S.W.6.

Hydraulic Hose Connections

RUBBER-SET flexible hydraulic hose connections, with the trade name Vulascot, can now be obtained. They can be supplied either complete with end fittings, or in coils of 50-ft. length with loose end fittings.

Two types of wire reinforcements are manufactured, either single- or double-wire braids. The connections can be sup-



plied in a variety of rubber compositions suitable for carrying oil, hydraulic fluid, diesel fuel, petrol, low pressure steam, and so on, besides air and water; plastic linings can also be incorporated for special applications. The rubber casing construction is seamless. Couplings and reducing unions or adaptors are supplied as standard.

After swaging the end fittings each connection is subjected to a pressure test at 1½ times the working pressure. The end fittings are also inspected to close limits.

If loose nuts become worn or damaged in use they can be exchanged at the user's works without difficulty. The old nut is sawn through and removed, and a new one can be attached to the nipple head by a thrust wire supplied by the manufacturer. This can be seen in the accompanying diagram which shows the method of attaching the end fitting.

The single-wire hose has an inner tube of synthetic rubber strongly reinforced by a layer of wire braiding. This is protected by a seamless outer cover of rubber. The two-wire hose has, over the seamless inner tube and wire braiding, a second wire braiding. A heavy seamless outer rubber cover is also given. The plastic-lined hose is normally supplied with a metal wire braiding as a reinforcement on the outside.

The connections are available with internal dies of $\frac{5}{8}$ -2 in. and a variety of end fittings. Further details may be obtained from the manufacturer, Vulascot (Great Britain) Limited, 87-89, Abbey Road, London, N.W.8.

Straddle Carriers

STADDLE carriers, manufactured in Finland by Valmet Oy, are now available in this country.

They are designed with lifting and transporting capacities of 5, 7 and 10 tons. An important feature of these machines is that all the main components are of British manufacture, including Perkins P.6 diesel engine, David Brown gearbox and so on.

The 5-ton model is produced with two alternative dimensions of load aperture to handle either 1½ standards or 2 standards of timber. The 10-ton model is available with three alternative dimensions of load aperture. All are equally suitable for the rapid and economical handling of pipes, tubes, r.s.j.'s, sheets, tanks, boilers, containers, palletised loads.

The carriers include as standard four-wheel steering, hydraulically-operated swinging load hooks giving an outward "swing" of over 6 in. on either side, enclosed independent springing on each rear wheel and a comfortable driver's cab, with sliding windows, heater and windscreen wiper. Power-assisted steering is optional on the 5-ton and 7-ton, and standard on the 10-ton models. All machines are capable of a speed of 30 m.p.h. in top gear. Five gears are available, forward and reverse, they are equally manoeuvrable in either direction. The minimum turning radius varies from 13 ft. on the 5-ton model to 16 ft. on the 10-ton model machine.

The speed of operation is largely due to the facility with which the driver, by operating the swinging load hooks, can immediately centre and raise the load, even although out of alignment on the bolsters, and by the sharp turns rendered possible by the four-wheel steering. The lifting and lowering of the load with a skilled driver is almost instantaneous and can be performed whilst the carrier is still in motion.

The load is held securely during transit, because the load hooks can be raised hydraulically to a point which usually ensures that the top of the load is pressed against the underside of the superstructure of the carrier.

Details of the Valmet straddle carriers may be obtained from the distributor in

this country, Materials Handling Equipment (G.B.) Limited, 40, Dover Street, Piccadilly, London, W.1.

Emergency Repairs with Plastic Steel

AN emergency repair kit of Devcon plastic steel, a combination of approximately 80 per cent steel and 20 per cent plastic, has been added to the range of Devcon products. It makes possible permanent repairs of pumps, valves, pipes, tanks, and so on, while under pressure. It is claimed already to have effected considerable savings in maintenance time and cost.

The kit contains a 1-lb. can of Devcon, hardening agent, a piece of rubber-lined steel, release agent for use where it is undesirable for the steel to marry with another surface, and a supply of specially treated laminated glass tape.

The glass tape is an innovation in these applications. It is used where extremely high strength is required or where large or corroded holes are present. The product is spread on the tape, applied as a bandage to the leak or hole, and allowed to harden. Its use, however, is not always essential. In most cases the product alone is strong enough to withstand pressure. For example, in laboratory tests a series of $\frac{5}{16}$ in. holes were filled with Devcon and withstood an internal pressure of over 2,000 lb. per sq. in. Used with laminations of glass tape it has a compression strength of over 50,000 lb. per sq. in. and a tensile strength of over 45,000 lb. per sq. in.

Corroded oil and chemical tanks may be repaired simply by placing the material on a piece of ordinary tape or wrapping paper and applying the bandage over the area.

The price of the repair kit is £1 1s.; further details may be obtained from the distributor in this country, E. P. Barrus (Concessionaires) Limited, 12-16, Brunel Road, Acton, W.3.

THOMAS DE LA RUE & CO. LTD. CHANGE OF NAME.—The name of Thomas de la Rue & Co. Ltd. will be changed to the De La Rue Co. Ltd. on August 14. On the same date the security printing division will commence operations as Thomas de la Rue & Co. Ltd. and the Potterton division as Thomas Potterton Limited.



Class "9" Freight Locomotives Fitted with Mechanical Stoker

First trial of Berkley equipment on British Railways standard design

Three British Railways standard 2-10-0 Class "9" freight locomotives recently constructed at the Crewe Works of the London Midland Region, have been fitted with Berkley mechanical stokers, under the direction of Mr. R. C. Bond, Chief Mechanical Engineer, British Transport Commission.

The stoker as fitted to these locomotives is similar to previous designs of the maker, particularly those operating in South Africa. It consists of four main units; the engine or power unit, tender conveyor, intermediate conduit and riser conduit. The engine, which is mounted on the tender front dragbox, powers the stoker to supply coal to the firebox and can be controlled to furnish the coal as sparingly and continuously as required. It is possible to work the engine in reverse in case of a blockage in the stoker mechanism.

The tender conveyor unit consists of a trough, conveyor screw, crusher and gearbox. The trough is located below the coal bunker and is mounted on rollers to allow for movement between engine and tender. The power from the engine unit is transmitted to the gearbox mounted at the rear of the conveyor unit by means of a slip shaft with universal joints. The gearbox transmits motion to the conveyor screw which carries coal from the bunker through the crusher, where it is broken down to the correct size and is then fed into the intermediate conduit.

The intermediate conduit includes a conveyor screw enclosed in a conduit or casting, which is connected to the riser by a special ball joint. The riser conduit, which extends upward through the footplate and is secured to the back of the firebox, includes a further conveyor screw which is connected to the intermediate screw by means of a universal joint. The riser screw has a reverse flight at the extreme end and

this results in the coal being levelled down and spread out prior to delivery into the firebox; this ensures a uniform delivery of coal over the distributor plate fitted above the hooded jet plate, and located at the underside of the firehole.

Firing Controls

The jet plate fits in the lower portion of the mouth of the riser conduit and it is possible to adjust easily the proper firing angularity. The front of the jet plate has hoods above the jet orifices which allow divergence of the steam jet before meeting the coal, thus ensuring efficient distribution over the grate. The jet plate is divided into four compartments, each controlled by a separate valve located in the jet manifold and marked to indicate which section of jets the valve controls, that is Left Front, Right Front, Left Back, Right Back.

Pressure gauges are located on a panel in the cab. In the case of the right- and left-hand gauges the black hand indicates jet pressure for the back corners and the red hand indicates jet pressure for the front of the firebox. The centre gauge shows the stoker engine pressure. The jet casting is protected from the heat of the fire by a protecting apron held in place by a removable pin.

With this form of stoker it is possible to adjust independently the coal feed and the steam jet pressures and thus obtain an even distribution of coal in the firebox under all conditions. It is also possible to fire by hand in case of failure of the stoker or when it is necessary to correct the firebed after removal of clinker, and so on, and also when working the locomotive on comparatively short journeys where time would be insufficient to allow correct setting of the coal feed and jet pressures of the stoker.

The accompanying illustrations show the engine unit, and the layout of the cab to suit the stoker and its control equipment. The installation is also the subject of editorial comment elsewhere in this issue.

Modernisation of Lancaster D.E. Workshops

Work now in progress on the modernisation and extension of the British Railways, London Midland Region, District Engineer's Workshops at Lune Road, Lancaster, includes a time-saving layout in the workshops. When complete the scheme will enable the shops to deal more effectively and expeditiously with the larger amount of work they are now handling.

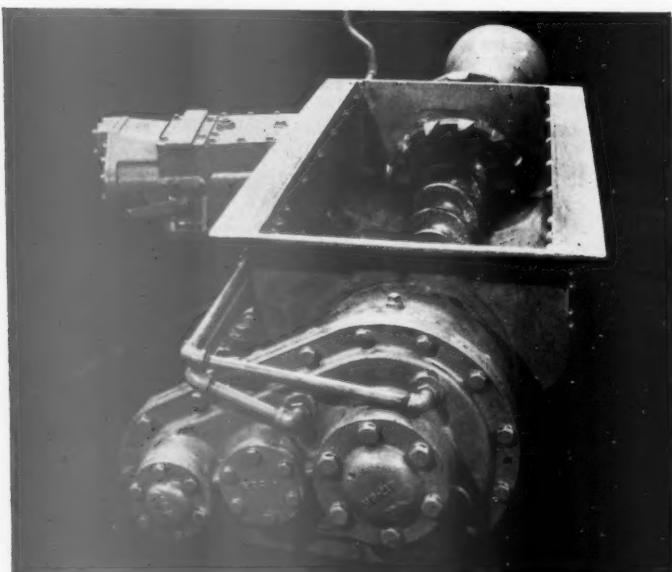
The workshops employ 42 men. They are to be extended by the construction of a new joiners' shop at one end of the existing building and the provision of additional accommodation for the general bridge and station stores, cement store, plant store, paint shop and the materials

compound. Bridge and station stores hitherto stocked at several points will be concentrated at Lancaster, with consequent reductions in amounts held.

Certain existing machines are to be repositioned and new machines installed: planer, rise-and-fall cross-cut saw, pendulum cross-cut saw, saw sharpener, and pneumatic hammer for the blacksmiths.

Included in the scheme are plans to modernise staff amenities. A drying room, messing facilities, gas cooker, sink, wash-hand basins and other improvements are to be provided. The work is being carried out by the District Engineer's own staff. Contractors for the equipment are:

Planer, rise-and-fall cross-cut saw, pendulum cross-cut saw, and saw sharpener, Thomas Robinson & Son Ltd., Rochdale; pneumatic hammer, B. & S. Massey Limited.



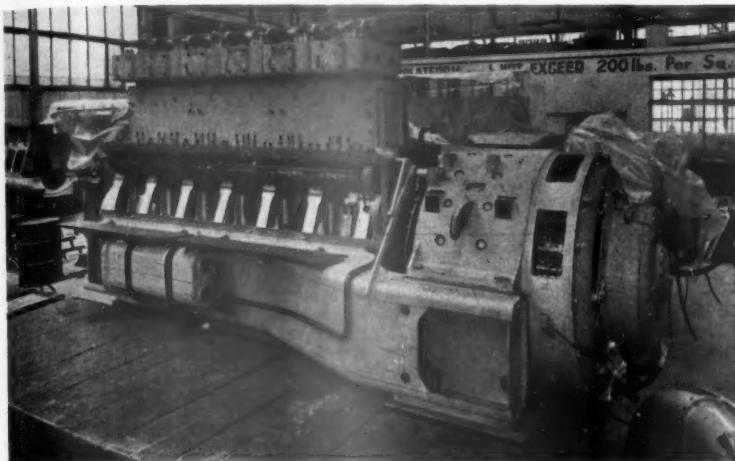
Tender conveyor unit of Berkley stoker, showing trough, conveyor screw, crusher, and gearbox; the stoker engine on left operates the screw assembly through shaft drive to gearbox (in front)



Cab of Class "9" engine fitted with stoker; the riser conduit and screw are at centre, and cocks controlling coal distribution on right

Production of Sulzer Diesel Engines by Vickers-Armstrongs

Output of 1,160-h.p. engines for British Railways planned at 12 per month from Barrow-in-Furness



Engine assembly bay, showing engines in various stages of completion : note use of polythene covers in background

The production of the British-built Sulzer traction diesel engine has now been planned to proceed at a rate of 12 engines per month. These engines are being built by Vickers-Armstrong (Engines) Limited at Barrow-in-Furness and the first deliveries to British Railways are of the six-cylinder type 6LDA28. The first engine has been incorporated in the Derby-built Type "2," 1,160-h.p. diesel-electric locomotive described in our issue of July 25.

The design, which has an output of 1,160 h.p. at 750 r.p.m., is basically similar to that already in use in considerable numbers; but many detail design improvements have been introduced to lengthen the period between overhauls and to facilitate servicing. Typical is the change from white-metal crankshaft and connecting rod bearings, bored in situ to those of the replaceable thin-shell copper/lead type. C.A.V. standard fuel injectors and single unit type pumps are operated from the engine camshaft; these incorporate the double helix plungers of Sulzer pattern which permit the injection timing to be varied automatically according to load.

The Swiss-built turbo-blower has been retained, but the centrifugal type air cleaner previously fitted to this blower has been superseded by a circular form Vokes filter of the neoprene-bonded-hair oil wetted type.

Extensive Use of Jigs

Jigs are employed extensively for welded fabrications and machine work, to eliminate hand fitting. A high proportion of components are stress-relieved and crack tested. From an early stage in the machining operations the main carcase is supported on the four pads used for mounting the engine in the locomotive, thereby ensuring the accurate inspection and alignment of cylinder bores and crankshaft bearings. Jig borers are used as production equipment for important components such as connecting rods and pistons. Engine erection is based on the progressive assembly of 10 units as a continuous programme.

New Cafeteria at York Station

The refreshment room on platform 14 at York Station, North Eastern Region of British Railways, has been converted to a self-service cafeteria with a small bar, and



Interior of new cafeteria at York Station, showing the bar and self-service counter

the premises re-decorated and re-furnished. The interior design has been based on the use of materials giving easy cleaning and the minimum amount of maintenance, also introducing bright colours: scarlet, blue, and yellow in the plastic areas, with tiled wall areas in grey, mingled with blue and yellow tiles. Other plastic finishes in grey tweed pattern are used to form a neutral background for the bright contrasting colours. The floor is finished with black and white striped tiles, with plain black tiles inserted at random.

The ceiling over the bar is in varied colour plastic squares divided by beech fins and incorporating recessed light fittings, while the main ceilings, which also carry heating panels, are painted in shades of blue and grey. Chairs and stool have been covered in scarlet with ebonised framing. The entrance from platform 11 is faced in the lower portion with pale blue faience blocks surmounted by a panel of dark blue plastic carrying white metal lettering "Cafeteria & Bar." The entrance lobbies from both platforms are, like the walls, in grey, blue and yellow tiles.

The cafeteria is open 24 hr. a day; besides the normal range of refreshments, hot snacks, which are warmed in an electrically heated display case, and drinks are available. Wide aspect windows have been fitted at both sides so that passengers using the cafeteria have uninterrupted views of the platforms.

The work carried out to the instructions of Mr. S. P. Smith, Chief Works Officer, British Transport Hotels & Catering Services, by Mr. N. A. Barber, Chief Architect, and to the design of Mr. C. P. Johnson, Senior Assistant Architect. The design of the entrance on No. 11 Platform was prepared by the Architect to the Chief Civil Engineer, York.

A.B.T.A. CONVENTION.—The 1958 convention of the Association of British Travel Agents is to be held in Torquay on October 18-23. The programme includes a railways session in the morning of October 22, and a reception and banquet the same evening, when the guest speaker will be Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade. Details may be obtained from the Association at 10, Mayfair Place, London, W.I.

Parliamentary Notes

Management of Railways

A general discussion in the House of Commons on the 10th annual report and accounts of the B.T.C. on July 17 had to be limited to 3 hr., because of an urgent debate on Jordan later.

Mr. Harold Watkinson, Minister of Transport & Civil Aviation, said Government policy was to create a structure which, while it retained accountability and responsibility to Parliament as a nationalised industry, tried to apply the modern methods of business management, and did not shrink from learning from those private enterprise industries upon whose success the whole prosperity of our country still depended.

"It is a bad thing in business, as well as in life," he added, "to be always taking one's pulse. In present circumstances of Select Committees and questions of privilege, we are in danger of making hypochondriacs out of the nationalised industries. We are always invigilating them, examining them, questioning them, and talking about them in Parliament and, as a result, they are always getting knocked about in public. How often must their chairman long to get on with perhaps the comparatively simple task of running their own business. My opinion may be shared by the Chairman of the B.T.C. that this great industry, which is still the largest employer of labour, ought to be able to get on with its own essential task.... Too much of the past 11 years have been spent in controversy and perhaps not enough in constructive preparation of a modern, forward-looking railway system, on which the future prosperity of all those who work for it depends.

I should like to pay my tribute to Sir Brian Robertson. He serves his country well. He has a very difficult task. He is trusted and respected by all those who work for the Commission and for all its variety of enterprises. We wish him and his colleagues and the unions well in their task."

Mr. Watkinson said the Government had made it clear that it was not going to increase the size of advances to the Commission, that the Commission did not wish to be relieved of the necessary disciplines under which any great business must work, and that it did not ask to be relieved of its commitment to break even in 1961-62. The Government was encouraged by the welcome fact that, wherever one examined the progress of modernisation on the railways, one found that it was paying better than anyone thought—paying off extremely well. As proof that the Government were generous, particularly in the last two years, to the Commission, he could announce that the Commission is placing orders for another 90 main line diesel locomotives for delivery in 1959, on top of the 200 already planned for delivery this year. This was not at the expense of the great electrification programme, in which was the real future. On modernisation the Government had given the Commission the money it asked for, and it was capable of spending it to the best advantage.

"I was delighted, also," he went on, "to see further evidence that the Commission carries the trade unions with it in the belief that a more modern and more efficient railway system is the right policy not only for management, but for the men as well."

The Chairman had given very clear pledges to the unions that any redundancy would be handled through the proper redundancy agreements. Most of this would be done by cutting down on recruitment. By the end of June, 1958, a reduction of over 12,500 was made in the numbers employed on the year previously. Similarly, recruitment had been heavily cut down. Equally, L.T.E. had to face heavy cuts.

On the question of branch lines and unremunerative services, Mr. Watkinson said he had seen the Chairman of the Central and Area Consultative Committees and had tried to explain to them—and he thought he had obtained their agreement to this—that the railways were not obliged to provide uneconomic services quite regardless of their operative efficiency. As the result of the "Bluebell Line" inquiry, great improvements would be made in the kind of case which the Commission brought forward, which would be better from the point of view of public information, easier for the consultative committees, and, perhaps, better for the railways. The yardstick must be: can the Commission's services one day be made to pay?

Mr. Watkinson also mentioned "fascinating" developments: new types of freight service; fully mechanised coal handling plant; better regional management, and more decentralisation; new merchandise charges scheme; and so on.

Mr. Ernest Davies (Enfield E.—Lab.) said that the fact that they had excessive transport today did not mean that the answer was to be found in ruthless cutting down of the public services, although some might be inessential and could be cut out, as in London. However successful modernisation might be, the final answer must still be found in the common ownership of the main means of transport.

Mr. James Dance (Bromsgrove—C.) complained of the discrepancies between rail and road freight charges, and of "the appallingly long time it took" to get a firm quotation from the railways; and of delays in delivery.

Mr. Leslie Spriggs (St. Helens—Lab.), making his maiden speech and speaking as an N.U.R. man, said the most important thing about nationalisation was its accountability to Parliament. Those in the industry did not want subsidies. He particularly welcomed the creation of new marshalling yards, and was astounded at the prices of the chief commodities used by the B.T.C. Timber sleepers costs were up by 550 per cent since 1939; steel by 410 per cent; copper tubes up by 270 per cent, and copper plates by 270 per cent. He appealed to the House to give the B.T.C. a free hand. If it wanted to put up prices, let it take the risk; if it wanted to bring down prices, give it that right.

Mr. W. F. Deedes (Ashford—C.) said that a great many of the young men who had joined the railways since the war were not of the same calibre as the older men. The ablest young men were not attracted to the industry. The approach to the affairs of the B.T.C. of very many people who should know better were utterly destructive and discouraging. The pursuit of this industry, and one or two others, had for sportsmen taken the place of what big game hunting and pig sticking were to their ancestors. He was tired of armchair critics who indulged in endless denigration of the B.T.C. and everything connected with it.

Mr. Sidney Dye (Norfolk S.W.—Lab.) said the decision to close 180 miles of

railway in sections in Norfolk was a disaster and alternative provision should be made.

Mr. Norman Cole (Bedfordshire S.—N.L.C.) made a similar contention regarding this area.

Mr. Airey Neave, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, said that he felt that the House was very much with Mr. Spriggs regarding the sensible attitude of his union as to the economics of modernisation. Sir Brian Robertson had been doing an excellent job, with all those who worked with him. They were concerned with a period when economies would have to be made as a preliminary operation to jumping off into a new and, they hoped, a successful era. As to new construction, all or most of the railway works would be kept busy to the limits of their existing resources for some time to come. In the longer term, as the volume of work began to fall, the Commission would have to be more selective in placing orders. With a fair wind and opportunity, there was no reason at all why the Commission should not develop as a financially sound organisation. The framework was now set for it. There were signs that the revolution on the railways would be accomplished quickly and smoothly within it.

Questions in Parliament

Railway Regional Programmes Cut

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation on July 16 if he would now authorise the B.T.C. to proceed with the capital investment programme in full which was planned by the Regional boards and presented to the Commission, but curtailed by capital cuts.

Mr. Watkinson: The Regional programmes for investment in the railways in 1958 and 1959 never reached the stage of being considered for authorisation by the Commission. The additional £25 million which the Government authorised last May is as much as the Commission felt it could usefully spend. It brings the level of investment well above that planned when the restrictions were imposed and will enable the Commission to accelerate the projects that will give an early financial return.

Mr. Davies: In view of the relaxation of control over private investment, the Minister should endeavour to obtain authority to allow the Commission to develop its programme as speedily as possible, and not continue to impose restrictions on the Commission.

Mr. Watkinson: The additional £25 million which the Government authorised last May was as much as the Commission felt it could usefully spend.

SHEEPBRIDGE ENGINEERING INCREASED DIVIDEND.—The group net profit of Sheepbridge Engineering Limited increased from £394,722 to £435,167 in the year ended March 31, 1958. The dividend is raised from 15 per cent to 16 per cent with a final of 11 per cent, compared with 10 per cent for the previous year. The balance due to the parent company was £416,840 (£371,916) and the dividend accounted for £276,000 (£258,750). The amount carried forward was £1,133,257 (£992,417).

Contracts and Tenders

Diesel-hydraulic and diesel-electric locomotives for Victorian Government Railways

Victorian Government Railways has placed an order with Tulloch Limited, New South Wales, for 25 600-h.p. diesel-hydraulic locomotives at a cost of some £775,000. They will be the first diesel-hydraulic locomotives on Victorian Railways. The locomotives will be fitted with Mercedes-Benz engines and Krupp transmission. The rest of the components will be manufactured by Tulloch Limited.

The Clyde Engineering Co. (Pty.) Ltd., of Granville, New South Wales, has received a contract from the Victorian Government Railways for 10 900-1,000 h.p. diesel-electric shunting locomotives. The estimated value of the contract is £A720,000. Deliveries will commence in March, 1959.

Canadian National Railways has placed orders for 144 diesel locomotives and 90 items of rolling stock to the value of some \$30,000,000 with three Canadian manufacturers. Montreal Locomotive Works Limited will build 32 1,800 h.p. passenger locomotives, four 1,400 main-line shunting locomotives, and 23 1,000 h.p. yard shunting locomotives; General Motors Diesel Limited, 85 main line shunting locomotives, 16 of 12,000 h.p. and 69 of 1,750 h.p., and 20 steam generator units; and the National Steel Car Corporation Limited, 60 air dump wagons. Delivery will start in October and be completed by August 1959.

Maschinenfabrik Augsburg-Nürnberg AG. has received an order from the Ceylon Government Railway for 25 broad-gauge double bogie diesel-hydraulic railcars, each to be powered by one M.A.N. 800-b.h.p. quick-running engine through Maybach Mekydro transmission.

Klöckner-Humboldt-Deutz A.G. has received an order for two 114-ton C-C type diesel-hydraulic locomotives of 1,600 b.h.p. for heavy mineral-train haulage from one of the coal railways in Westphalia.

The French National Railways has placed an order with Maybach Motorenbau for 37 sets of type K.104 Mekydro hydraulic transmission for installation with engines of 825 to 925 b.h.p. in powerful railcars. This brings the total number of Mekydro transmissions on the S.N.C.F. up to 116, placed in one original order and eight repeat orders.

British Railways, Eastern Region, has placed the following contracts:

R. Ridd & Son (Contractors) Ltd., Hornchurch, Essex: cleaning and painting of station buildings, goods yards, signalboxes, signals, point rodding at Bromley, West Ham Manor Road, Plaistow, Upton Park and East Ham Stations.

Dorman Long (Bridge & Engineering) Limited, Luton, Beds: reconstruction of the portion of the superstructure of underline bridge No. 1350 carrying the main lines over Grove Passage and the portion of the superstructure of the same bridge carrying the suburban lines over Andrews Road, between Cambridge Heath and London Fields

Standard Telephones and Cables Limited, New Southgate, N.11: supply and installation of train describer equipment at Romford, Gidea Park, Brentwood, Shenfield, Potters Bar, and New Barnet

Troughton & Young Limited, Knightsbridge, S.W.3: supply, delivery, and erection of electrical installation in new car shed, staff accommodation block, boiler house block, garage, and petrol store, at extension of Ilford Electric Train Depot

F. H. Wheeler & Co. Ltd., Sheffield, 1: supply, delivery and erection of electrical installations at new Goods Depot, Lincoln

Wm. Moss & Sons Ltd., Loughborough, Leicestershire: construction of office block at new Goods Depot, Lincoln.

The British Railways, North Eastern Region, has placed the following contracts:

T. Belt & Sons Ltd., York: erection of new office accommodation, Holgate Villa Site, York

Feska Industrial Equipment Limited, London: two lifting jacks for carriages, Faverdale Works, Darlington

Tarslag Limited, Stockton-on-Tees: reconstruction of roof, Shed No. 11, Simonside, Tyne Dock

James Scott & Co. (Engineers) Ltd., Newcastle: electrical installation, Nos. 10 and 12 warehouses, Simonside, Tyne Dock.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follows:

From South Africa:

10,014 automatic couplers, "S" type complete 8 in. by 6 in. bottom operated, drg. CME-68/10709-478/B

1,200 automatic couplers, "J" type complete 5½ in. by 4½ in. by 3½ in. short shank, drg. CME-68/10713-478/C

700 automatic couplers, "T" type complete 5¼ in. by 4¾ in. by 3 in. shank, drg. CME-68/10714-478/C

50 automatic couplers, "H" type 5 in. by 5 in. shank, drg. CME-68/10715-478/B

5,670 automatic couplers, "M" type complete 5 in. by 5½ in. shank without strap, drg. CME-68/10717-476/B

3,140 levers to various drawings

4,550 top lifters, to various drawings
1,670 bottom lifters to various drawings

5,850 gravity locks to various drawings
13,350 knuckles to various drawings

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H.7074: For Automatic Couplers and Spares" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is August 22, 1958. Local representation is essential. The Board of Trade reference is ESB/19141/58.

1,800 steam heat pressure gauges, 150 lb. drawing No. L.9703—item No. 2

1,800 steam pressure gauges, 300 lb. drawing No. L.9703—item No. 4

100 steam chest duplex pressure

gauges, 225 lb. drawing No. L.9703—item No. 5

1,135 steam pressure gauges, single 250 lb. dial to be approximately 4 in. dia., generally in accordance with specification No. C.M.E. 40/1942, drawing No. L.9703

1,160 duplex vacuum gauges drawing No. L.9703—item No. 3

1,000 vans single vacuum gauges drawing No. L.9703—item No. 1.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H.7406: Vacuum and Steam Gauges," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is August 22, 1958. Local representation is essential. The Board of Trade reference is ESB/19145/58.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

WITHDRAWAL OF PASSENGER SERVICE FROM EASTERN REGION STATIONS.—From September 15, North Drove, on the M.G.N. Line between Spalding and Bourne, and Abbotts Ripton and Great Ponton stations on the East Coast main line, of the Eastern Region, will be closed to passenger traffic. Passengers will thereafter be catered for by the bus services operating in the areas and by neighbouring stations. The stations will remain open for goods traffic for the time being and C. & D. services for parcels will continue to be available as before. Facilities for handing in parcels for despatch and "to be called for" traffic will also remain.

SCOTTISH REGION DEPOTS TO BE CLOSED.—British Railways, Scottish Region, announces that with the approval of the Transport Users' Consultative Committee for Scotland, three depots are to be closed on August 11. Fort George Goods and Parcels Depot is to be closed with the branch line leading to it from Gollanfield Junction Station, where alternative facilities are available. British Railways C. & D. arrangements in the area will continue as at present. Gollanfield is on the former Highland Railway line from Inverness to Nairn. Tranent Goods Depot, on the former North British Railway, near Edinburgh, also is to be closed with the branch leading to it. Alternative rail facilities for traffic in full wagon loads are available at Prestonpans, Macmerry, and Ormiston Stations. British Railways C. & D. service in the area will continue as at present. The third depot is Juniper Green Goods and Parcels Depot, Edinburgh, on the Balerno branch of the former Caledonian Railway. Alternative rail facilities are available at Colinton Station. British Railways C. & D. service in the area will continue as at present.

J. W. ROBERTS LIMITED CHANGE OF ADDRESS.—The Midland Regional Office of J. W. Roberts Limited has been changed to Somerset House, Temple Street, Birmingham 2, tel. Midland 1367.

Notes and News

More Parking near Stations Suggested.—The need for increased parking facilities near railway stations in Outer London is urged by the London & Home Counties Traffic Advisory Committee in its report for 1957. "We are also inclined to the view," the report states, "that there may be cases where increased use of public transport could be encouraged by the provision of authorised long-term street parking places in the vicinity of railway stations where there are insufficient off-street facilities."

South African Railways Surplus.—Mr. Schoeman, Minister of Transport, presenting his budget to the South African Parliament last week, announced that South African Railways & Harbours had a surplus on last year's working of £4,311,000, against an original estimate of £775,000 deficit. This result was due to increased traffic and higher rates. For the present year he has budgeted for a net deficit of £729,000 on a total expenditure of £187,658,000. Mr. Schoeman stated that the greater part of the development programme, at present estimated to cost £315,000,000 should be completed by the end of 1961.

"Freedom of Scotland" Ticket.—Five hundred "Freedom of Scotland" tickets have been sold since the beginning of April, when this new facility was introduced. The ticket permits the holder unlimited travel on seven consecutive days on the whole of British Railways in Scotland and the steamer services of the Caledonian Steam Packet Co. Ltd., at a fare of £9 first or £6 second class, with reductions for family travel, and also to travel in the observation cars, Pullman trains, and boat trains in Scotland without additional charge. Every ticket holder has been asked to comment on his or her experience at the end of the tour. A high proportion of replies have been received, which are reported to comment favour-

ably on the ticket, and many have included constructive suggestions, some of which will be included in next year's arrangements. Many of the holders have stressed the courtesy and attention received from railway staff.

Sub-Station Fire at Plaistow, Eastern Region.—Trains from Southend to Fenchurch Street, Eastern Region, British Railways, were delayed late on Monday evening as a result of an electric cable and sub-station fire at Plaistow which severed signalling and telecommunication cables. Traffic was also stopped on the District Line of London Transport. Passengers for stations between Barking and Fenchurch Street were conveyed by electric trains from Southend Victoria, and a steam service was maintained between Southend Central and Barking. Excursion trains to destinations on the north side of London were run from Southend Central and passengers were cleared from Southend by 11 p.m.

Nyasaland Railways Limited Results.—Operating receipts of the Nyasaland Railways Limited for 1957 amounted to £1,089,924 compared with £1,036,454 in 1956, an increase of 5 per cent. Expenditure, however, rose from £819,031 to £881,682, an increase of 8 per cent, leaving a net operating surplus of £208,242 compared with £217,423 in 1956 a decrease of 4 per cent. Under the provisions of the Finance Act, 1957, the company qualifies as an overseas trade corporation, and as a result the liability to United Kingdom income tax has been reduced by some £40,000. The ordinary dividend was increased from 5 to 6 per cent.

New Factory for Firth Co. Ltd.—A new factory for the Firth Co. Ltd., Warrington, built to replace the one destroyed by fire in 1957, is to be brought into production from September 1, when the ground floor will be ready for occupation. The new building is of reinforced concrete,

designed by Mr. Charles McIntosh in co-operation with the design department of Richard Hill Limited of Middlesbrough, which firm also supplied the reinforcement. Acid resistant paint and lead for the windows were supplied by British Lead Mills Limited. The Firth Co. Ltd., Richard Hill Limited, and British Lead Mills Limited are all members of the Firth Cleveland Group.

Wagon Repairs Limited Profits.—The group profits, before tax, of Wagon Repairs Limited amounted to £724,679 for the year ended March 31, 1958, compared with £718,652 for the previous year. After tax the net balance was £314,691 against £332,017. An additional £476,505 has been added to profits; the amount set aside to meet possible future liability to profits tax on undistributed profits and no longer required. The ordinary dividend is maintained at 20 per cent.

August Bank Holiday Traffic on British Railways.—During the August Bank Holiday weekend an average number of passengers were carried by British Railways and there were no reports of overcrowding, mainly due to the adverse weather. Traffic on the London Midland Region was fairly heavy and some of the Sunday excursion trains were duplicated. The Eastern Region cross-country trains were heavily loaded, and there was an increase in passengers carried on the London, Tilbury & Southend Line compared with last year. The Western Region ran 285 additional trains, but passengers carried were only average. The Southern Region ran 341 additional trains from London to the South and South Eastern coastal resorts and the West of England.

Pye Limited Maintains Ordinary Dividend.—Pye Limited is maintaining 12½ per cent for the year ended March 31 on the deferred and "A" deferred ordinary stock. Holders of the 8 per cent participating preferred ordinary again receive a 10 per cent total. Group profits are £1,660,592, com-

Royal Visit to Dartmouth



The Duke of Edinburgh welcomed at the British Railways pontoon, Dartmouth, by the Lord Lieutenant of Devon, Lord Roborough, and the Mayor of Dartmouth, on July 28, after disembarking from the Royal Yacht; Mr. K. W. C. Grand, General Manager, Western Region, is on the right



The British Railways pontoon at Dartmouth, decorated by the Department of the Public Relations & Publicity Officer, Western Region, during the visit of the Duke of Edinburgh

pared with £1,680,660 for the previous year, subject to tax of £929,000 against £941,827. The balance attributable to the company, after minority interests, is reduced from £685,072 to £590,064. Stockholders were told last April at the time of the debenture issue that minority interests in profits for 1957-58 were considerably larger. It was also then stated that group turnover had been fully maintained but home profit margins had been materially lower, and that, because of increased borrowing and higher rates, interest charges had increased by over £100,000. A reduction of up to one-sixth in consolidated profits, before tax, compared with 1956-57, was then considered likely.

Empire Games Restaurant Tariff Card.—The distinctive tariff-folder reproduced in the accompanying illustration was specially produced for restaurant cars operating during the recent Empire Games at Cardiff, between Paddington and South Wales in the Western Region of British Railways. Finished in laminated plastic, it bears a design in red, based on the traditional Welsh dragon. It has a motif of stylised laurel leaves in gold, each leaf bearing the name of a competing country. The folder, which was designed by Mr. Eric Fraser, F.I.S.A., contains the menu card in an inside pocket.

Increased Proportion of Edgar Allen & Co. Ltd. Trackwork Sales.—Referring to the sales of the three main groups of activities of Edgar Allen & Co. Ltd., the Chairman, Mr. W. H. Higginbotham, in his financial statement for the year ended March 29, stated that the output and sales of the Engineering and Trackwork group were nearly 20 per cent greater in value. There was a substantial increase in sales of trackwork and railway material. The total profits were accordingly considerably greater in amount, their ratio to turnover being well maintained despite higher labour costs. Difficulties in obtaining supplies of materials, Mr. Higginbotham added, have also been greatly reduced. A



Tariff-folder produced by the British Transport Commission in connection with the recent Empire Games at Cardiff. Illustration shows front and back covers of the card

résumé of the financial report was given on page 116 of our last week's issue.

Trans-Zambesia Railway Co. Ltd.—Mr. Vivian L. Oury, Chairman, Trans-Zambesia Railway Co. Ltd., in his circulated statement, reports that a further sum of £248,000 has been received from the Government of the Federation of Rhodesia & Nyasaland, completing a total of £475,000 which the Government agreed to advance to cover the cost of rolling stock and ancillary works under the second and final phase of the company's five-year programme of capital works. Operating receipts for 1957 amounted to

£1,067,292 (£1,011,813), expenditure, including provision for renewals, amounted to £790,021 (£761,545), resulting in net receipts of £277,271 (£250,268).

Vent-Axia Limited Results.—The accounts of Vent-Axia Limited for the year ended March 31, 1958, show a group trading profit of £290,613, an increase of £44,977 over last year. The total ordinary dividend for the year is 35 per cent. These results have been obtained from increased sales both in Vent-Axia Limited and the subsidiary, Axia Fans Limited. The sales of Vent-Axia units have grown over the years with a fairly steady regularity, the

Installing A.T.C. on London Midland Region Main Line

(See our February 14 issue)



At distant signal near Watford Junction, showing permanent magnet being placed in position, with (left) electro-magnet energised when signal is at "clear", and which then cancels action initiated by passage of engine over permanent magnet



Standard British Railways A.T.C. track apparatus in position on up fast line north of Watford Junction, L.M. Region, showing ramp to protect against dragging equipment

August 8, 1958

chairman, Mr. J. C. Akester stated, and, in his opinion, should so continue for a long time yet. With further expansion in mind, a corner site of some 4½ acres has been taken on a 99 years' lease from the Crawley Development Corporation where the administrative, technical and manufacturing activities for both companies will be concentrated. To help finance the growth of the business generally, £200,000 is being borrowed by the issue to an institution on a reasonable basis of 6½ per cent medium term secured loan stock.

Bank Holiday Train Accidents on the N.E. Region.—Two railway accidents occurred in the North Eastern Region of British Railways on August 4, in each case a train hit the buffer stops when arriving at a station. At Whitby Town Station 58 people were injured when a train from Darlington to Scarborough crashed into the buffers. At York 11 people were injured when a Pacific engine drawing eight coaches crashed into the buffers and then mounted the platform end. The train had come from Sunderland.

Economy Cuts in Southern Region Services.—Winter passenger services on the Southampton/Havre and the Channel Islands services are to be reduced as an urgent economy measure. These services carry very few passengers during the winter. The Southampton/Havre service, the longest all-the-year cross-Channel route, is to be cut from three sailings a week to two each way. The Channel Islands services will be cut from six sailings a week to four in each direction, two via Southampton and two via Weymouth; hitherto there have been three sailings each way via Southampton and another three each way via Weymouth in the winter. The very full programme of sailings during the summer will continue. Winter cuts on both the Havre and the Channel Islands services were foreshadowed in the programme of economy measures which the B.T.C. recently announced it was considering. On both these routes the services have made a heavy loss during the winter. The Transport Users' Consultative Committee for the South-Eastern Area has been informed.

Forthcoming Meetings

August 20 (Wed.) to August 30 (Sat.).—Model Engineer Exhibition at the New Horticultural Hall, Westminster, S.W.1.

September 2 (Tue.).—Permanent Way Institution, Leeds & Bradford Section, in the British Railways Social & Recreation Club, Ellis Court, Leeds City Station, at 7 p.m. Paper on "American railroads," by Mr. J. Nichols, British Railways, Eastern Region.

September 2 (Tue.).—Railway Correspondence & Travel Society, Sheffield Branch, at Livesey-Clegg House, 44, Union Street, Sheffield, at 7.30 p.m. Paper on "Fifty years of Midland performance," by Mr. J. F. Clay.

September 5 (Fri.).—The Railway Club, at 320, High Holborn, London, W.C.1, at 7.30 p.m. Paper on "The great Bristol contest of 1835," by Mr. K. G. Carr.

September 5 (Fri.) to September 15 (Mon.).—Railway Correspondence & Travel Society tour of Austria.

Railway Stock Market

Despite the continued uncertainty of international news, stock markets have been inclined to strengthen under the lead of British Funds which responded to renewed City hopes of a reduction in the bank rate to 4½ per cent before long. The latest gold and dollar reserve figures were regarded hopefully, because although they show only a moderate increase, this was a good achievement indicating world confidence in the pound. In July of last year there was a drop of £4,000,000 in the gold and dollar reserves. At this time of the year we normally have to draw on our reserves to make dollar payments for imports from the U.S. There is talk in the City that important decisions may be made by the Commonwealth Economic Conference at Montreal in September, which will be followed by the annual meeting of the International Monetary Fund & International Bank in October.

There have been few movements among foreign rails. Antofagasta ordinary stock was 14, compared with 14½ a week ago and the 5 per cent preference stock eased to 26, while the 5 per cent (Bolivia) debentures were quoted at 94½. In other directions, United of Havana second income stock eased from 7 to 6½. San Paulo Railway 3s. units were again quoted at 2s. and Mexican Central "A" bearer debentures remained at 70½.

International of Central America shares were \$21½ with the preferred stock quoted at \$114½. Costa Rica ordinary stock was 16½ and the second debentures at 90½. Chilean Northern first debentures were 41.

Elsewhere, West of India Portuguese capital stock was 79. Nyasaland Railways shares were 11s. White Pass have risen from \$13½ to \$14½ helped by the better trend of dollar stocks which reflected the strength of Wall Street, though best prices were not held. Canadian Pacifics after changing hands over \$53, eased to \$52½, which was fractionally lower than a week ago; the 4 per cent preference stock strengthened to 54½, while the 4 per cent debentures have been well maintained at 66½.

Westinghouse Brake shares remained firm at 37s. 6d. and Beyer Peacock 5s. shares held their recent improvement to 8s. 4½d., while G. D. Peters remained as firmly held as ever and were quoted at 21s. 10½d. and Charles Roberts 5s. shares were firm at 8s. at which there is a yield of over 9½ per cent on the basis of last year's 15 per cent dividend. In other directions, Wagon Repairs 5s. shares held steady at 10s. 10½d. at which there is a yield of nearly 9½ per cent on the basis of last year's 20 per cent dividend. The latter comes out of earnings of almost 44 per cent. The annual report of the last-named company mentions that in the current financial year there has been some falling off in the number of wagons available for repair. Nevertheless, the prevailing assumption in the market is that there seem good prospects of the 20 per cent dividend being maintained. Gloucester Wagon 10s. shares have eased to 14s. Birmingham Wagon shares kept at 15s. 3d. and elsewhere, North British Locomotive at 11s. were also the same as a week ago.

Associated Electrical again changed hands around 50s. and there was a further strengthening of General Electric shares from 34s. 3d. to 34s. 9d. English Electric held their rise to 54s. 9d. and Crompton Parkinson 5s. shares remained at 10s. 6d. W. G. Allen 5s. shares were 8s. 6d. on the results and maintained 12½ per cent divi-

dend. Braithwaite & Company's shares were 21s. 6d. following news of the maintained 8 per cent dividend and of the special 2 per cent, tax free, capital distribution. John Brown have advanced to 28s. 7½d. on the increase in the dividend to 10 per cent, while Vickers have risen from 31s. 10½d. to 32s. 9d. British Timken were again 45s. 3d. and Ruston & Hornsby eased from 22s. 9d. to 22s. 6d. while Associated British Engineering 5s. shares receded to 3s. 3d. on the fall in profits, which, however, was not a surprise in view of the warning given in the half-yearly statement.

Shares of the Dowty Group advanced sharply to 35s. in response to the higher profits and raising of the tax free distribution from 9 per cent to 11½ per cent. Pressed Steel 5s. shares have been maintained at 14s. 9d.

OFFICIAL NOTICES

CIVIL ENGINEERING ESTIMATOR required for the Newport, South Wales, office of Railway and Civil Engineering Contractors. Applicants should have wide experience of tendering for Civil Engineering Contracts and a knowledge of Railway Engineering and Estimating would be considered an advantage. The appointment offers the successful applicant excellent prospects in an expanding Company. Applications which will be treated in the strictest confidence, should state age, qualifications, experience in detail, and indication of the salary required. Write: Isca Foundry Company Limited, Newport, Mon.

CONTRACTS MANAGER required for Railway and Civil Engineering Firm. Applicants must be qualified Civil Engineers experienced in Railway Design and Construction, well versed in Contract procedure and capable of meeting and dealing with the Project Engineers of the Nationalised Industries and with Consultants. The position is an executive one and involves controlling Contracts and Site Personnel in various parts of the country. Initiative and drive are essential, and the appointment offers excellent scope, good salary and incentive bonus to the successful applicant. Applications which will be treated in the strictest confidence should state—Age, qualifications, experience in detail, and indication of salary required.—Write: General Manager, Eage Construction Co. Limited, East Common Lane, Scunthorpe. Telephone No.: Scunthorpe 4513.

GHANA PUBLIC SERVICE COMMISSION.—Applications are invited for the following vacancies in the GHANA RAILWAY:—**ASSISTANT WORKS MANAGER.** To assist the Works Manager in maintaining heavy workshop repairs to locomotives, cranes, auxiliary plant and other mechanical equipment. Candidates must hold a B.Sc. (Eng.) or other recognised engineering degree and must have not less than 2 years' practical post-graduate experience, or being not less than 23 years of age, must have passed Parts I and II of the examination of the Institution of Mechanical Engineers. Salary in range £1,080-£2,080 a year. **CARRIAGE AND WAGON SUPERINTENDENT.** To be responsible to the Chief Mechanical Engineer for the maintenance and repair of carriages and wagons. Candidates who must not be less than 35 years nor more than 50 years old, must (i) have had regular training in the design, maintenance and repair of carriages and wagons; and (ii) have had at least 5 years' administrative experience in the Carriage and Wagon Section of a reputable Railway. A knowledge of saw-milling and saw-doctoring would be an advantage. Salary in range £1,770-£1,970 a year according to experience. Appointments on contract for two tours each of 18-24 months duration. Gratuity at rate of £12 10s. for each completed month of residential service payable on completion of contract. Outfit allowance £30-£60 on first appointment. Free first-class passages for officer, wife and up to 3 children under 18 years and in addition an education allowance for children when not resident in Ghana of £100 a child for up to 3 children under 18 years. Generous home leave on full pay. Income tax at low local rates. Preservation of superannuation or pension rights, where applicable, can be arranged. For further particulars and application form write, stating age, qualifications and experience, to The Director of Recruitment, Ghana High Commissioner's Office, 13, Belgrave Square, London, S.W.1.

THE Proprietors of Patent No. 730303, for "Improvements in Train Wheel Unit," desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Hasletine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

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